Vol. 1013 Number 1

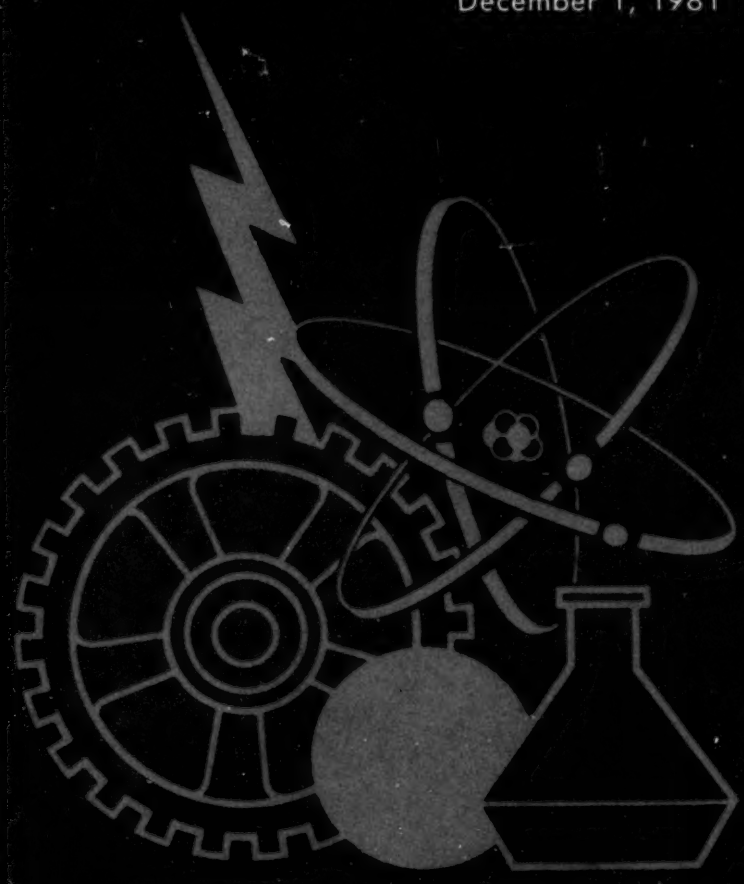
# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

December 1, 1981



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Trademark
Office

# OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

December 1, 1981 Volume 1013 Number 1


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# PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty Information

For information concerning the PCT, consult Chapter 1800 of the Manual of Patent Examining Procedure and notices 90–95 in the consolidated listing of notices appearing in the Official Gazette of Jan. 6, 1981.

The PCT fees in effect after May 19, 1981 are as follows:

| | |
|---|---|
| Transmittal fee | $ 35.00 |
| Search fee | 300.00 |
| International Basic Fee (for the first 30 sheets of an international application) | 215.00 |
| Basic Supplemental Fee (for each sheet over 30) | 4.00 |
| International Designation Fee (for each State for which a national patent is sought, or group of States for which the same regional patent is sought) | 50.00 |

RENE D. TEGTMEYER,
*Assistant Commissioner for Patents.*

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### Board of Appeals Decisions Rendered in the Month of Oct. 1981

| | |
|---|---|
| Affirmed | 182 |
| Affirmed in Part | 16 |
| Reversed | 80 |
| Total | 278 |

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### REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**3,928,553,** Re. S.N. 262,711, Filed May 11, 1981, Cl. 223/424.1, RADIOMMUNOASSAY METHOD FOR TRIIODO-THYRONINE AND THYROXINE, Charles S. Hollander, Owner of Record: *Professional Staff Association of the Los Angeles County Harbor General Hospital, Torrance, Calif.,* Attorney or Agent: I. Morley Drucker, Ex. Gp.: 223

**4,047,567,** Re. S.N. 298,037, Filed Aug. 31, 1981, Cl. 166/293, OIL WELL CEMENTING PROCESS, Jerry D. Childs, et al., Owner of Record: *Halliburton Co., Duncan, Okla.,* Attorney or Agent: John H. Tregoning, et al., Ex. Gp.: 354

**4,163,269,** Re. S.N. 289,078, Filed July 31, 1981, Cl. 361/42, GROUND FAULT AND FIRE DETECTOR SYSTEM, William F. Helwig, Jr., et al., Owner of Record: *Avtec Industries, Inc., Downers Grove, Ill.,* Attorney or Agent: Edward D. Gilhooly, et al., Ex. Gp.: 212

**4,180,733,** Re. S.N. 288,877, Filed July 31, 1981, Cl. 250/345, INFRARED RAY GAS ANALYZING APPARATUS, Shinya Ueda, Owner of Record: *Fuji Electric Co., Ltd., Kanagawa, Japan,* Attorney or Agent: Richard C. Sughrue, et al., Ex. Gp.: 256

**4,181,285,** Re. S.N. 294,804, Filed Aug. 20, 1981, Cl. 249/061, FREEZING MOULD BAG, Erling Vangedal-Nielsen, Owner of Record: *Inventor,* Attorney or Agent: Martin Fleit, et al., Ex. Gp.: 147

**4,201,202,** Re. S.N. 294,369, Filed Aug. 19, 1981, Cl. 128/79, PENILE IMPLANT, Roy P. Finney, et al., Owner of Record: *Medical Engineering Corp., Racine, Wisc.,* Attorney or Agent: Thad F. Kryshak, Ex. Gp.: 335

**4,219,289,** Re. S.N. 298,159, Filed Aug. 31, 1981, Cl. 406/70, ARRANGEMENT FOR LOADING A CARD, Hermann Trutzschler, Owner of Record: *Trutzschler GmbH & Co., KG., Monchengladbach, Germany,* Attorney or Agent: Donald M. Seltzer, et al., Ex. Gp.: 313

**4,228,394,** Re. S.N. 280,430, Filed July 6, 1981, Cl. 324/62, DIGITAL OHMMETER WITH ELECTRICAL CONTINUITY TESTER, John B. Crosby, Owner of Record: *Beckman Instruments, Inc., Fullerton, Calif.,* Attorney or Agent: Robert J. Steinmeyer, et al., Ex. Gp.: 252

**4,234,538,** Re. S.N. 296,780, Filed Aug. 27, 1981, Cl. 422/064, APPARATUS FOR MONITORING CHEMICAL REACTIONS AND EMPLOYING MOVING PHOTOMETER MEANS, Guenter Ginsberg, et al., Owner of Record: *Coulter Electronics, Inc., Hialeah, Fla.,* Attorney or Agent: I. Irving Silverman, et al., Ex. Gp.: 173

**4,234,539,** Re. S.N. 296,778, Filed Aug. 27, 1981, Cl. 422/64, APPARATUS FOR MONITORING CHEMICAL REACTIONS AND EMPLOYING MOVING PHOTOMETER MEANS, Guenter Ginsberg, et al., Owner of Record: *Coulter Electronics, Inc., Hialeah, Fla.,* Attorney or Agent: I. Irving Silverman, et al., Ex. Gp.: 173

**4,234,540,** Re. S.N. 296,779, Filed Aug. 27, 1981, Cl. 422/64, APPARATUS FOR MONITORING CHEMICAL REACTIONS AND EMPLOYING MOVING PHOTOMETER MEANS, Guenter Ginsberg, et al., Owner of Record: *Coulter Electronics, Inc., Hialeah, Fla.,* Attorney or Agent: I. Irving Silverman, et al., Ex. Gp.: 173

**4,245,095,** Re. S.N. 293,588, Filed Aug. 17, 1981, Cl. 546/68, INDOLO ISOQUINOLINE COMPOUNDS, David C. Horwell, et al., Owner of Record: *Lilly Industries Ltd., London, England,* Attorney or Agent: Arthur R. Whale, et al., Ex. Gp.: 122

**4,257,898,** Re. S.N. 289,378, Filed Aug. 3, 1981, Cl. 210/751, METHOD OF PROCESSING WASTE SLUDGE FROM WET PHOSPHORIC ACID PURIFICATION FACILITIES, Peter Meurer, et al., Owner of Record: *Uhde GmbH, Dortmund, Germany,* Attorney or Agent: David H. Wilson, et al., Ex. Gp.: 176

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### REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.21(b)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

**Re. 29,314,** Reexam. No. 90/000,095, Requested: Nov. 2, 1981, ASPHALTENE HYDRODESULFURIZATION WITH SMALL CATALYST PARTICLES IN A PARALLEL REACTOR SYSTEM, Carlson, deceased, Henke, et al., Owner of Record: *Gulf Research & Development Co., Pittsburgh, Pa.,* Attorney or Agent: Alvin E. Ring, Ex. Gp.: 116, Requester: Gulf Research & Development Co., Pittsburgh, Pa.

**3,672,935,** Reexam. No. 90/000,094, Requested: Oct. 22, 1981, Cl. 282/27.5, PRESSURE-SENSITIVE RECORD MATERIAL, Robert E. Miller, et al., Owner of Record: *Appleton Papers, Inc., Appleton, Wisc.,* Attorney or Agent: Paul S. Phillips, Jr., Ex. Gp.: 164, Requester: Appleton Papers, Inc., Appleton, Wisc.

**3,909,883,** Reexam. No. 90/000,091, Requested: Oct. 20, 1981, Cl. 174/138, LOCKING BASE FOR PLASTIC COMPONENTS, James F. Fegen, Owner of Record: *Richco Co., St. Paul, Minn.,* Attorney or Agent: Martin Faier, Ex. Gp.: 210, Requester: Gregory J. Maier, Arlington, Va.

**4,129,509,** Reexam. No. 90/000,098, Requested: Nov. 2, 1981, Cl. 252/49.5, METALWORKING FLUID COMPOSITIONS AND METHODS OF STABILIZING SAME, Sudhir K. Shringarpurey, Owner of Record: *National Research Laboratories, Cincinnati, Ohio,* Attorney or Agent: Wood, Herron & Evans, Ex. Gp.: 116, Requester: Cushman, Darby & Cushman, Washington, D.C.

**4,161,050,** Reexam. No. 90/000,097, Requested: Nov. 2, 1981, Cl. 15/159, HAIR BRUSH, Tetsuo Sasaki, et al., Owner of Record: *Kao Soap Co., Ltd., Tokyo, Japan,* Attorney or Agent: Blanchard, Flynn, Thiel, Boutell & Tanis, Ex. Gp.: 240, Requester: Dale H. Thiel & L. Martin Flynn, Kalamazoo, Mich.

**4,190,041,** Reexam. No. 90/000,099, Requested: Nov. 3, 1981, Cl. 128/4, CLEANING DEVICE FOR WIRE GUIDE TUBE IN AN ENDOSCOPE, Toshio Chikama, Owner of Record: *Machida Endoscope Co., Ltd., Tokyo, Japan,* Attorney or Agent: Peter L. Berger, Ex. Gp.: 335, Requester: Albert M. Zalkind, Arlington, Va.

**4,198,351,** Reexam. No. 90/000,092, Requested: Oct. 19, 1981, Cl. 568/473, FORMALDEHYDE PRODUCTION PROCESS, Anthony J. Branecky, et al., Owner of Record: *Celanese Corp., New York, N.Y.,* Attorney or Agent: Thomas Morgan, Ex. Gp.: 120, Requester: Bayer AG, Leverkusen, Germany

**4,210,376,** Reexam. No. 90/000,100, Requested: Nov. 4, 1981, Cl. 339/17, ELECTRICAL CONNECTOR RECEPTACLE, Donald W. K. Hughes, et al., Owner of Record: *AMP, Inc., Harrisburg, Pa.,* Attorney or Agent: F. W. Raring, Ex. Gp.: 320, Requester: AMP, Inc., Harrisburg, Pa.

**4,270,967,** Reexam. No. 90/000,103, Requested: Nov. 5, 1981, Cl. 156/299, GLUING MACHINE, Clendon W. Cone, Owner of Record: *Webco Development Corp., Glens Falls, N.Y.,* Attorney or Agent: Blum, Kaplan, et al., Ex. Gp.: 161, Requester: James R. Custin, Milwaukee, Wisc.

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**U.S. Accession to Hague Convention Abolishing the Requirement of Legalization for Foreign Public Documents**

On Oct. 15, 1981, the Hague "Convention Abolishing the Requirement of Legalization for Foreign Public Documents" entered into force between the United States and twenty-eight foreign countries that are parties to the Convention. The Convention applies to any document submitted to the United States Patent and Trademark Office for filing or recording, which is sworn to or acknowledged by a notary public in any one of the member countries. The Convention abolishes the certification of the authority of the notary public in a member country by a diplomatic or consular officer of the United States and substitutes certification by a special certificate, or apostille, executed by an officer of the member country. Accordingly, the Office will accept for filing or recording a document sworn to or acknowledged before a notary public in a member country if the document bears, or has appended to it, an apostille certifying the notary's authority. The requirement for a diplomatic or consular certificate, specified in 37 CFR 1.66 and note 1 of 37 CFR 3.45, will not apply to a document sworn to or acknowledged before a notary public in a member country if an apostille is used.

The member countries that are parties to the Convention are:

| | | |
|---|---|---|
| Austria | Italy | Spain |
| Bahamas | Japan | Suriname |
| Belgium | Lesotho | Swaziland |
| Botswana | Liechtenstein | Switzerland |
| Cyprus | Luxembourg | Tonga |
| Fiji | Malawi | U.K. of Great Britain and N. Ireland |
| France | Malta | |
| Germany, Fed. Rep. of | Mauritius | United States |
| Hungary | Netherlands | Yugoslavia |
| Israel | Portugal | |
| | Seychelles | |

The Convention prescribes the following form for the apostille:

**Model of certificate**

The certificate will be in the form of a square with sides at least 9 centimetres long

**APOSTILLE**
(Convention de La Haye du Oct. 5, 1961)

1. Country: .....
This public document
2. has been signed by .....
3. acting in the capacity of .....
4. bears the seal/stamp of .....
.....

**Certified**

5. at ..... 6. the .....
7. by .....
8. No. .....
9. Seal/stamp: 10. Signature:
.....

Nov. 5, 1981.

GERALD J. MOSSINGHOFF
*Commissioner of Patents and Trademarks.*

# PATENT NOTICES

**Certificates of Correction for the Week of Dec. 1, 1981**

| | | | |
|---|---|---|---|
| Re. 30,587 | 4,253,191 | 4,275,093 | 4,284,637 |
| Re. 30,590 | 4,254,175 | 4,275,209 | 4,284,860 |
| Re. 30,723 | 4,254,680 | 4,275,212 | 4,285,524 |
| D. 260,525 | 4,255,517 | 4,275,215 | 4,285,565 |
| D. 260,950 | 4,256,013 | 4,275,496 | 4,285,809 |
| 3,667,550 | 4,258,232 | 4,276,220 | 4,285,938 |
| 4,004,751 | 4,258,614 | 4,276,524 | 4,286,036 |
| 4,055,471 | 4,258,696 | 4,276,572 | 4,286,219 |
| 4,082,790 | 4,259,208 | 4,276,606 | 4,287,071 |
| 4,084,058 | 4,259,303 | 4,276,653 | 4,287,086 |
| 4,088,686 | 4,259,518 | 4,277,205 | 4,287,104 |
| 4,101,649 | 4,260,555 | 4,277,527 | 4,287,115 |
| 4,119,265 | 4,261,202 | 4,277,539 | 4,287,322 |
| 4,156,050 | 4,262,230 | 4,277,637 | 4,287,359 |
| 4,166,458 | 4,263,670 | 4,277,986 | 4,287,360 |
| 4,168,909 | 4,264,786 | 4,278,054 | 4,288,504 |
| 4,171,602 | 4,264,985 | 4,278,141 | 4,288,750 |
| 4,202,191 | 4,265,518 | 4,278,323 | 4,288,963 |
| 4,203,388 | 4,265,533 | 4,278,989 | 4,289,295 |
| 4,209,636 | 4,265,628 | 4,279,324 | 4,289,504 |
| 4,215,137 | 4,267,233 | 4,279,806 | 4,289,557 |
| 4,218,765 | 4,267,385 | 4,279,815 | 4,289,617 |
| 4,219,920 | 4,267,483 | 4,279,818 | 4,289,684 |
| 4,219,921 | 4,267,810 | 4,280,193 | 4,289,758 |
| 4,223,505 | 4,268,608 | 4,280,771 | 4,289,912 |
| 4,225,595 | 4,268,711 | 4,280,803 | 4,289,917 |
| 4,227,437 | 4,270,563 | 4,280,805 | 4,290,170 |
| 4,237,116 | 4,270,672 | 4,280,817 | 4,290,210 |
| 4,240,513 | 4,271,482 | 4,280,863 | 4,290,544 |
| 4,242,480 | 4,271,617 | 4,281,044 | 4,290,672 |
| 4,242,910 | 4,271,721 | 4,281,128 | 4,290,676 |
| 4,245,156 | 4,271,907 | 4,281,762 | 4,290,710 |
| 4,245,673 | 4,271,926 | 4,282,252 | 4,290,911 |
| 4,245,921 | 4,272,553 | 4,282,385 | 4,291,286 |
| 4,246,052 | 4,273,481 | 4,282,437 | 4,292,586 |
| 4,246,262 | 4,273,626 | 4,283,466 | 4,292,646 |
| 4,247,802 | 4,274,043 | 4,283,500 | 4,293,135 |
| 4,248,835 | 4,274,482 | 4,283,578 | 4,293,138 |
| 4,249,847 | 4,274,599 | 4,283,753 | |
| 4,250,073 | 4,274,805 | 4,283,941 | |
| 4,252,802 | 4,274,995 | 4,284,611 | |

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**Patents Available for License or Sale**

For U.S. Patent No. 4,289,018, Entitled METHOD AND APPARATUS FOR MEASURING DEGASIFICATION, Please Contact:

Neil F. Greenblum
Sandler & Greenblum
701 S. 23rd St.
Arlington, Va. 22202
(703) 521-7800.

The following Patents are offered by James D. Davidson, P.O. Box 1293 Pontiac, Mich., 48056-1293.

4,267,666. SHUTTER SHIELDS (TM) THERMAL SHUTTERS FOR WINDOWS AND GLASS SLIDING DOORS.

4,294,038. SHUTTER SHIELDS (TM) USED FOR CONVERTING SOUTHERLY EXPOSED WINDOWS INTO A SOLAR PANEL.

4,254,999. STD. DIE SHOES FOR STAMPING PRESSES (METAL FABRICATING).

3,137,258. STANDARD DIE GAUGES FOR METAL STAMPING DIES.

4,204,373. INSULATION TAPE, EXPANDABLE TAPE FOR SEALING WINDOWS AND DOOR FRAME AS THEY ARE INSTALLED.

D. 242,949. FONT OF TYPE, Stephen Earl Diamond, P.O. Box 99238, San Francisco, Calif. 94109.

3,396,744. SYSTEM FOR ELIMINATION OF CONDENSATION IN FUEL STORAGE TANKS. Leo L. Schwarz, 43 Crescent Pl., Monroe, Conn. 06468.

3,598,437. AUTOMOBILE COLLISION GUARD MEANS. Mary V. Montgomery Harris, 5080 Rich Rd., Memphis, Tenn. 38117.

3,840,924. COMBINATION CLOCK, BED LAMP, RADIO AND TAPE PLAYER. Frank Hamilton, 248 Frederick #2, Detroit, Mich. 48202.

3,940,894. BURIAL MEANS AND THE LIKE. Abner H. Nunes, 1854 Mahana St., Honolulu, Hi. 96816.

3,988,520. DIMENSIONAL IMAGE REPRODUCTION. Marlene A. Riddle, 3501 Anthony Dr., Las Vegas, Nev. 89121.

4,136,764. MOTHER ALICE'S BREAD VENDING MACHINE. Alice Johnson, 8650 Belford Ave., #1, Los Angeles, Calif. 90045.

4,214,554. FEEDING APPARATUS FOR NURSING ANIMALS. James L. Smith, Jr., 5742 Wilkins Ave., Oakdale, Calif. 95361.

4,214,774. DISASSEMBLABLE BOAT CARRIER AND LAUNCHER. Ronald P. Kluge & Herman F. Spirk, 5902 Bustleton Ave., Philadelphia, Pa. 19149.

4,221,459. ERECT IMAGE TELESCOPE OPTICAL SYSTEM. William E. Fisher. Correspondence to: Ian C. McLeod 531 N. Clippert St., Lansing, Mich. 48912.

4,244,126. LAMP SHADE REMINDER CLOCK. Don Spencer James 1020 Bradbourne #77, Durate, Calif. 91010.

4,282,733. FINGER RETAINED KEY HOLDER ASSEMBLAGE. Johnston & Schmitt, 4138 Eagle Rock Blvd., Los Angeles, Calif. 90065.

4,276,496. GAS DISCHARGE LAMP EMPLOYING A PULSE GENERATOR WITH A DOUBLE STAGE AMPLIFICATION CURCUIT. Guido Arena-Ochoa. Correspondence to: Walter C. Farley, Roylance, Abrams, Berdo & Farley, Suite 315, 1225 Connecticut Ave., N. W., Washington, D.C. 20036.

General Electric Co. is prepared to grant non-exclusive licenses under the following patents upon reasonable terms to domestic manufacturers.

3,349,168. NON-SEGREGATED METAL CLAD BUS DUCT WITH INSULATING FRAMES FOR SUPPORTING BUS BARS.

4,158,188. FUSE WITH FREE STANDING HELICAL FUSE ELEMENT AND METHOD OF MAKING THE SAME.

4,260,213. ELECTRIC CIRCUIT INTERRUPTER HAVING MEANS FOR RESTRICTING FLOW OR ARC-GENERATED GASES THEREFROM.

4,275,373. COMBINATION EXPULSION FUSE.

Applications for license may be addressed to: Division Patent Counsel, Switchgear & Distribution Transformer

Division, General Electric Co., 6901 Elmwood Ave., Philadelphia, Pa. 19142.

Applications for license under the following patent should be addressed to: Mr. Arnold E. Renner, Division Patent Counsel Industrial Electronics Systems Division, General Electric Co., 1501 Roanoke Blvd., Salem, Va. 24153.

4,238,810. FORCED COMMUTATION PRECIPITATOR CIRCUIT.

Applications for license may be addressed to: Patent Counsel, Transportation Systems Business Operations, General Electric Co., 2901 East Lake Rd., Erie, Pa. 16531.

4,266,442. FLYWHEEL INCLUDING A CROSS-PLY COMPOSITE CORE AND A RELATIVELY THICK COMPOSITE RIM.

The RCA Corp. offers to grant non-exclusive licenses on reasonable terms and conditions under the patents listed below. Inquiries respecting licenses under RCA patents should be addressed to RCA Corp., Sr., Vice President, Licensing, 30 Rockefeller Plz., New York, N.Y. 10020.

4,286,790. OPTICAL DISC CHANGER APPARATUS.

4,287,256. WAFER AND BOULE PROTECTION DURING THE BLADE RETURN STROKE OF A WAFER SAW.

4,287,496. ASSEMBLY FOR POSITIONING THE COUPLING PROBE OF A WAVEGUIDE.

4,287,587. SIGNAL LOSS DETECTOR FOR VIDEO DISC.

4,287,689. METHOD FOR IMPROVING THE QUALITY OF LOW FREQUENCY OUTPUT OF A VIDEO DISC PICKUP STYLUS.

4,288,719. CRT WITH MEANS FOR SUPPRESSING ARCING THEREIN.

4,288,811. LUMINANCE AND CHROMINANCE SIGNAL SEPARATION NETWORK.

4,288,812. COLOR FILTER.

4,288,875. CONTROLLED LOCAL OSCILLATOR WITH APPARATUS FOR EXTENDING ITS FREQUENCY RANGE.

4,289,372. TECHNIQUE FOR RECORDING A HOLOGRAM SUITABLE FOR USE IN OPTICAL RETRIEVAL SYSTEM.

4,289,406. LIGHT TRANSMISSION MEASUREMENT METHOD.

4,290,168. HINGE CONSTRUCTION WITH POSITIVE LOCKING MEANS.

4,290,671. COLOR ENCODING FILTER.

4,291,239. ARCHITECTURE LINE-TRANSFER CCD IMAGERS.

4,291,257. REGULATED DEFLECTION CIRCUIT WITH START-UP AND ELECTRONIC CIRCUIT BREAKER CONTROL.

4,291,269. SYSTEM AND METHOD FOR FREQUENCY DISCRIMINATION.

4,291,275. FREQUENCY DEMODULATION SYSTEM.

4,291,324. SEMICONDUCTOR POWER DEVICE HAVING SECOND BREAKDOWN PROTECTION.

4,291,336. COMPOSITE KEYING SIGNAL GENERATOR FOR A TELEVISION RECEIVER.

4,291,413. SEARCH TYPE TUNING SYSTEM WITH DIRECT ADDRESS CHANNEL SELECTION APPARATUS.

4,291,642. NOZZLE FOR DISPENSING VISCOUS FLUID.

4,292,092. LASER PROCESSING TECHNIQUE FOR FABRICATING SERIES-CONNECTED AND TANDEM JUNCTION SERIES-CONNECTED SOLAR CELLS INTO A SOLAR BATTERY.

4,292,511. APPARATUS AND METHOD FOR READING AN IDENTIFYING LABEL ON AN INFORMATION RECORD.

4,292,605. RELAXATION OSCILLATORS WITH ELECTRICAL CONTROL OF PERIODICITIES OF OSCILLATION.

4,292,637. INTERROGATING RADAR FOR USE WITH TAGGED TARGETS.

4,292,646. SEMICONDUCTOR THYRISTOR DEVICE HAVING INTEGRAL BALLAST MEANS.

4,292,654. DEFLECTION SYSTEM AND SWITCHED-MODE POWER SUPPLY USING A COMMON RAMP GENERATOR.

4,292,672. INSPECTION SYSTEM FOR DETECTING DEFECTS IN REGULAR PATTERNS.

4,281,816. AUTOMATIC APPARATUS FOR MOLDING A PREFORM.

4,282,266. METHOD FOR DETERMINING SILICON CONTENT IN LAYERS OF ALUMINUM AND SILICON.

4,282,268. METHOD OF DEPOSITING A SILICON OXIDE DIELECTRIC LAYER.

4,282,311. METHOD FOR FABRICATING FLY-LEADS FOR VIDEO DISC STYLI.

4,282,460. DEFLECTION AND POWER SUPPLY CIRCUIT WITH REDUCED START-UP DRIVE.

4,282,461. TELEVISION RASTER CENTERING AID.

4,282,477. SERIES VOLTAGE REGULATORS FOR DEVELOPING TEMPERATURE-COMPENSATED VOLTAGES.

4,282,478. REFERENCE CURRENT SUPPLY CIRCUITS.

4,282,496. STARTING CIRCUIT FOR LOW POWER OSCILLATOR CIRCUIT.

4,282,510. APPARATUS FOR DISCERNING THE NOTICEABLE PRESENCE OF SPATIAL FLUCTUATIONS OF INTENSITY WITHIN A TWO-DIMENSIONAL VISUAL FIELD.

4,282,511. APPARATUS FOR DISCERNING THE NOTICEABLE PRESENCE OF SPATIAL FLUCTUATIONS OF INTENSITY WITHIN A TWO-DIMENSIONAL VISUAL FIELD.

4,282,516. KEYBOARD ENCODING ARRANGEMENT.

4,282,537. SILICON MOS INDUCTOR.

4,282,538. METHOD OF INTEGRATING SEMICONDUCTOR COMPONENTS.

4,282,546. TELEVISION IMAGE SIZE ALTERING APPARATUS.

4,282,549. PULSE GENERATOR FOR A HORIZONTAL DEFLECTION SYSTEM.

4,282,556. INPUT PROTECTION DEVICE FOR INSULATED GATE FIELD EFFECT TRANSISTOR.

4,282,887. RIDGE-WAVEGUIDE APPLICATOR FOR TREATMENT WITH ELECTROMAGNETIC ENERGY.

4,283,654. MODULAR TUBE SHADOW MASK SUPPORT SYSTEM.

4,283,738. NTSC TO PAL TRANSCODER.

4,283,741. SIGNAL SEPARATION NETWORKS.

4,284,033. MEANS TO ORBINED AND ROTATE TARGET WAFERS SUPPORTED ON PLANET MEMBER.

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4,284,712. FABRICATION OF VIDEO DISC FLY-LEADS.

4,284,911. SWITCHING NETWORK.

4,284,945. CURRENT DIVIDERS USING EMITTER-COUPLED TRANSISTOR PAIRS.

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4,286,164. METHOD FOR DETERMINING THE AVERAGE WIDTH OF LUMINESCENT STRIPES OF A VIEWING SCREEN.

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4,286,282. PERIODICALLY BIASED VIDEO DISC PLAYER SERVO SYSTEM.

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4,286,285. CHECKERBOARD COLOR FILTER PROVIDING TOLERANCE.

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4,286,304. DEGAUSSING ARRANGEMENT FOR MASER SURROUNDED BY MAGNETIC SHIELDING.

4,286,336. AUTOMATIC SHUTDOWN ARRANGEMENT FOR STAND-ALONE TELEVISION MODULATOR.

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KD0357-01-08. GEGAS-D COAL GASIFIER GRATE DESIGN FOR CLINKER CRUSHER.

KD0410-01-08. PROCESS FOR COAL LIQUEFACTION.

KD0410-01-07. TWO-STAGE COAL LIQUEFACTION.

KD0408-01-05B. PROCESS FOR COAL LIQUEFACTION AND CATALYST.

ED1715-77-19. AN IMPROVED PROCESS FOR THE HYDROCONVERSION OF COAL.

ED0234-77-02. FLUID COOLED BLADE OR VANE AND METHOD OF MANUFACTURE.

ED0234-77-12. METHOD AND MEANS FOR RECAPTURING COOLANT IN A GAS TURBINE.

KD0469-03-01. BRUSH ACTUATION MECHANISM.

KD0386-01-03B. FOCUSING ELECTRODES FOR HIGH-INTENSITY IONIZER STAGE OF ELECTROSTATIC PRECIPITATOR.

ED0725-80-09. DOUBLE BELL MOUTH IONIZER ASSEMBLY.

KD1031-02-01. SYSTEM FOR REMOVING SOLIDS FROM A USED LIME OR LIMESTONE SLURRY SCRUBBING LIQUOR IN FLUE GAS DESULFURIZATION.

XD1402-02-01B. GAS STREAM DESULFURIZATION USING AN AQUEOUS POLYAMINE AND ACID SCRUBBING SOLUTION.

ED1336-80-20. METHOD AND MEANS FOR MEASURING PARTICULATE MATTER ON A FILTER.

KD0636-02-01B. IRON-BASED NICKEL ALLOY.

KD0636-02-02B. IRON-BASED NICKEL-CHROMIUM ALLOY.

KD0644-01-01. SPALL-RESISTANT STEEL TUBING OR OTHER STEEL ARTICLES SUBJECTED TO HIGH TEMPERATURE STEAM AND METHOD.

KD0427-01-01B. LOW POROSITY CERAMIC BODY.

KD0427-01-02B. HIGH STRENGTH CERAMIC BODY.

KD7841-01-01. BACKFILLING MATERIAL AND METHOD OF PREPARATION THEREOF.

KD7837-01-13. MULTIPLE WALL STRUCTURE FOR FLEXIBLE CABLE USING TUBULAR AND SPIRAL CORRUGATIONS.

KD7837-01-15. INSULATION SPACER FOR GAS-INSULATED TRANSMISSION LINE WITH IMPROVED OUTER RIM STRUCTURE.

KD7837-01-17. NON-METALLIC INSULATOR INSERTS FOR FLEXIBLE GAS INSULATED CABLE.

ED7876-79-17. CRYOGENIC CABLE AND METHOD OF MAKING SAME.

KD0478-01-02B. CIRCUIT INTERRUPTER USING A MINIMUM OF DIELECTRIC LIQUID.

KD0478-01-03B. CIRCUIT INTERRUPTER USING DIELECTRIC LIQUID WITH ENERGY STORAGE.

EDO281-80-05. EMISSION CONTROLLED CURRENT LIMITER FOR USE IN ELECTRIC POWER TRANSMISSION AND DISTRIBUTION.

KD0655-01-04. HIGH VOLTAGE PLAIN BREAK CIRCUIT INTERRUPTER.

KD0360-02-03. METHOD AND MEANS FOR DETECTING FAULTS IN SEAL-

ED ELECTRIC APPARATUS.

KD1360-02-12. A DETECTOR FOR FAULT DETECTION IN SEALED ELECTRICAL APPARATUS USING DIRECT FLUXGATE MAGNETOMETRY.

KD0657-01-06. A SETTER FOR A CERAMIC BODY AND METHOD OF FORMATION AND USE.

KD0657-01-04B. A VOLTAGE LIMITING COMPOSITION AND METHOD OF FABRICATING THE SAME.

ED1504-78-17B. METHOD AND MEANS FOR DAMPING SUBSYNCHRONOUS OSCILLATIONS AND DC OFFSET IN AN AC POWER SYSTEM.

ED1504-79-24. METHOD AND MEANS FOR DETECTING SPURIOUS ELECTRICAL SIGNALS IN AN ELECTRICAL POWER SYSTEM.

ED1504-79-31. MEANS FOR DAMPING SUBSYNCHRONOUS OSCILLATIONS IN AN AC POWER SYSTEM INCLUDING OVERLOAD PROTECTION.

KD0750-01-02. VOLTAGE REGULATOR UTILIZING A STATIC VAR GENERATOR WITH HALF PERIOD AVERAGING AND SATURATING TYPE FIRING ANGLE CONTROL.

KD0754-01-05. VACUUM INTERRUPTER WITH INCREASED SEPARATION OF FUNCTIONS.

KD0994-01-02. IMPROVED MECHANICAL FILTER AND METHOD OF ACOUSTICALLY COUPLING WAVEGUIDES THEREIN.

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KD0425-01-01. METAL OXIDE VARISTOR MANUFACTURE.

KD0564-01-13. SERIES CONNECTED OSCILLATING TRANSVERSE FIELD INTERRUPTER AND METHOD.

KD0847-01-01. DIELECTRIC GAS MIXTURE.

KD0847-01-02. DIELECTRIC GAS MIXTURE FOR USE IN ELECTRICALLY INSULATING A CONDUCTOR.

KD0669-02-01B. THYRISTOR WITH SEGMENTED TURN-ON LINE.

KD0669-01-05B. THYRISTOR WITH EVEN TURN-ON LINE POTENTIAL AND METHOD.

KD0669-01-06. THYRISTOR WITH VOLTAGE BREAKOVER CURRENT CONTROL AND METHOD.

KD0567-01-04. IMPROVED PACKAGE FOR LIGHT-TRIGGERED THYRISTOR.

KD0668-01-06. DATA TRANSMISSION SYSTEM AND METHOD.

KD1137-01-01. TEMPERATURE SENSING ARRANGEMENT AND METHOD.

ED1290-79-30. TECHNIQUES FOR MAKING AMORPHOUS METAL MATERIAL AND SUPERCONDUCTORS THEREFROM.

KD1290-02-01. ELECTRICAL METAL CORE AND METHOD OF ASSEMBLING AN ELECTRICAL COIL AROUND THE CORE.

KD1290-02-07. BONDING OF AMORPHOUS METAL STRIPS TO CONSTRUCT A LAMINATED MAGNETIC CORE.

KD1290-02-11. A TRANSFORMER CORE MADE OF AMORPHOUS STRIP METAL.

KD1290-02-12. METHOD OF MAKING A TRANSFORMER OR LIKE CORE FROM AMORPHOUS METAL STRIP.

KD1290-02-17. A METHOD OF MAKING A STACKED MAGNETIC CORE FROM AMPORPHOUS STRIP METAL.

KD0930-01-17. VAPORIZATION COOLED ELECTRICAL INDUCTIVE APPARATUS.

KD0930-01-15. VAPORIZATION-COOLED ELECTRICAL APPARATUS.

KD0794-02-01. DETECTION SYSTEM FOR DISTINGUISHING BETWEEN VOIDS AND FOREIGN PARTICLES IN MATERIALS AND METHOD.

KD0998-01-01. PORTABLE PHASE ANGLE METER INSTRUMENT.

KD0998-01-02. HALL SENSING APPARATUS.

KD0998-01-03. ELECTRICALLY INSULATING SEAL ASSEMBLY.

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KD1470-01-04. SURGE ARRESTER HAVING A NON-FRAGMENTING OUTER HOUSING.

KD1518-01-02. UNDERGROUND CABLE INSTALLING APPARATUS AND METHOD UTILIZING A MULTI-POSITIONABLE PLOW BLADE.

KD1518-01-04. UNDERGROUND CABLE INSTALLING APPARATUS AND METHOD UTILIZING A FLUID JET ASSISTED, VIBRATING BLADE ARRANGEMENT.

KD1518-01-05. APPARATUS FOR AND METHOD OF INSTALLING UNDERGROUND CABLE HAVING ABOVE GROUND TERMINALS.

KD1143-01-01. IMPROVED DRY TYPE ELECTRICAL COIL AND METHOD OF MAKING SAME.

KD0661-01-01. HYBRID POWER CIRCUIT BREAKER.

KD0429-02-04B. APPARATUS FOR SUPPORTING A STATOR WINDING IN A SUPERCONDUCTING GENERATOR.

KD0429-01-01B. SLIDING SUPPORT FOR A SUPERCONDUCTING GENERATOR ROTOR.

ED0429-80-02. ELECTROSTATIC GENERATOR AND MOTOR.

KD1435-01-01. METHOD OF AND SYSTEM FOR DETERMINING PARTICULAR

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KD1473-01-05. A LIQUID COOLANT TRANSFER DEVICE.

KD0128-04-10. A COMPOSITE SULFUR ELECTRODE CONTAINER AND METHOD OF MANUFACTURE.

KD0128-04-12. A METHOD FOR FORMING A CHROMIUM ALLOY ON A FERROUSCARBON SUBSTRATE.

KD0842-04-01. ELECTROCHEMICAL CELL INCLUDING RIBBED ELECTRODE SUBSTRATES AND METHOD.

ED1085-79-16B. PHOTOVOLTAIC CELL EMPLOYING DISCRETE SEMICONDUCTOR BODIES AND METHOD OF MAKING SAME.

KD0583-01-02. HIGHLY DISPERSED SUPPORTED GROUP VIII METAL-PHOSPHORUS COMPOUNDS AND HIGHLY DISPERSED, SUPPORTED GROUP VIII METAL-ARSENIC COMPOUNDS AND A PROCESS FOR MAKING SAID COMPOUNDS.

KD0583-01-03. THE PREPARATION OF HIGHLY DISPERSED SUPPORTED GROUP VIII METAL CATALYSTS AND THE REDISPERSION OF SINTERED OR AGGLOMERATED SUPPORTED GROUP VIII METAL CATALYSTS BY THE ADDITION OF PHOSPHORUS.

KD0544-01-06B. HEATING AND COOLING SYSTEM AND METHOD.

XD1670-01-01. HEAT MEASURING APPARATUS AND METHOD FOR USE IN A CONTINUOUS FLUID STREAM.

ED1085-80-33. IMPROVED PHOTOVOLTAIC CELL.

ED1932-80-03. METHOD AND APPARATUS TO LIMIT THE BUILDUP OF COMBUSTIBLE GASES.

ED0694-78-18. METHOD AND MEANS FOR MEASURING FLOW OF A TWO PHASE FLUID.

KDS101-01-03. METHOD AND MEANS FOR ULTRASONIC INSPECTION.

KDS105-01-01. REEL ASSEMBLY FOR FLEXIBLE TUBING AND THE LIKE.

KDS108-01-01. MEASURING DEVICE FOR USE WITH TUBULAR PRODUCTS.

KDS125-01-01. METHOD AND MEANS FOR DETECTING MAGNETIC DEPOSITS IN HEAT EXCHANGER AND THE LIKE.

KD1233-01-01. METHOD AND MEANS FOR RELIABILITY AND MAINTAINABILITY ANALYSIS.

KDS103-01-01. METHOD AND MEANS FOR OPTICAL INSPECTION OF THE INTERIOR SURFACE OF TUBING.

KD0698-01-02B. METHOD AND APPARATUS FOR EFFICIENTLY GENERATING ELASTIC WAVES WITH A TRANSDUCER.

EDS175-79-02. METHOD AND APPARATUS FOR SEPARATING OUT SOLIDS SUSPENDED IN FLOWING PURE WATER SYSTEMS.

EDS167-79-13. CORROSION PROTECTION SYSTEM FOR NUCLEAR POWER PLANT.

KD0606-01-03. METHOD AND APPARATUS FOR ULTRASONIC IMAGING USING A LINE SOURCE AND A LINEAR RECEIVER ARRAY.

ED1125-78-15. METHOD OF MONITORING DEFECTS IN TUBULAR PRODUCTS.

KD1395-01-01. PROBE OF ELECTROMAGNETIC TESTING OF STRUCTURES.

ED1448-79-08. WATER PENETRANT EXAMINATION METHOD USING AN ELECTRO-OPTICAL SCANNER.

KD1448-05-01. SYSTEM AND METHOD FOR MEASURING ULTRASONIC RETURN SIGNALS.

KD1398-05-01. A CONDUCTIVITY SENSOR FOR MONITORING CORRODENTS BEING DEPOSITED IN A STEAM TURBINE.

ED1448-79-07. APPARATUS AND METHOD FOR ULTRASONIC DETECTION OF FLAWS IN POWER PLANT PIPING SYSTEMS.

KD1168-01-01B. PRESSURE BALANCED EXTERNAL REFERENCE ELECTRODE ASSEMBLY AND METHOD.

KD0403-02-02. MULTIFREQUENCY EDDY CURRENT TEST APPARATUS AND METHOD.

KD0403-02-03. MULTIFREQUENCY EDDY CURRENT TEST APPARATUS AND METHOD.

KD1329-01-01. DESCALING PROCESS.

XD1246-01-01. LEAK DETECTING ARRANGEMENT ESPECIALLY SUITABLE FOR A STEAM CONDENSER AND METHOD.

KD0620-22-10. NUCLEAR REACTOR GUARD VESSEL ARRANGEMENT.

KD1447-01-01. A SYSTEM FOR CONTINUOUSLY MONITORING THE IONIC CONTENT OF STEAM-PRODUCING WATER.

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KD0620-21-01B. NUCLEAR REACTOR CONTAINMENT STRUCTURE.

KD0620-22-02. METHOD AND APPARATUS FOR SEALING CONTAINERS.

KD0620-22-03. INTERMEDIATE HEAT EXCHANGER FOR A LIQUID METAL COOLED NUCLEAR REACTOR AND METHOD.

KD0620-22-07. APPARATUS FOR THERMALLY INSULATING NUCLEAR REACTOR PRIMARY VESSELS.

KD0260-22-08. FLOW DISTRIBUTION SYSTEM FOR COOLANT IN A NUCLEAR REACTOR AND METHOD.

KD0620-22-13. FAILED ELEMENT DETECTION AND LOCATION SYSTEM AND METHOD FOR USE IN A NUCLEAR REACTOR.

KD0620-22-16. A CABLE HANDLING SYSTEM FOR USE IN NUCLEAR REACTOR.

KD0620-22-18. PIPE COUPLING ASSEMBLY ESPECIALLY SUITABLE FOR USE IN THE NUCLEAR REACTOR.

KD0620-22-20. SUPPORT STRUCTURE CORE

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KD0620-26-02. APPARATUS FOR SUSPENDING THERMAL SHIELDING WITHIN A NUCLEAR REACTOR.

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ED1253-79-06. STORAGE ASSEMBLY FOR SPENT NUCLEAR FUEL.

KD1253-02-01. APPARATUS FOR PREVENTING THE DIVERSION OF PLUTONIUM IN NUCLEAR FUEL REPROCESSING.

KD1253-02-02. METHOD AND APPARATUS FOR MINIMIZING DIVERSION OF RADIOACTIVE SAMPLES FROM A NUCLEAR FUEL SAMPLING SYSTEM.

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4,187,086. MEMBRANE PACKAGE FOR IMMOBILIZED LIQUID MEMBRANE.

4,111,663. REACTOR FOR SOLVENT REFINED COAL AND METHOD.

4,021,328. REACTOR FOR SOLVENT REFINED COAL AND METHOD.

4,127,475. A PROCESS FOR THE ISOLATION OF CHEMICALS FROM PROCESSED COALS.

4,133,646. PHENOLIC RECYCLE SOLVENT IN TWO-STAGE COAL LIQUEFACTION PROCESS.

4,257,922. PROCESS FOR COAL LIQUEFACTION AND CATALYST.

4,228,002. ENHANCED ANTI-SOLVENT SEDIMENTATION OF SOLIDS FROM LIQUIDS USING PRESSURIZED CARBON DIOXIDE GAS.

4,221,654. HYDROPROCESSING COAL LIQUIDS.

4,200,521. HYDROPROCESSING OF SOLVENT REFINED COAL.

4,178,266. METHOD OF IMPROVING COMPATIBILITY OF COAL LIQUIDS WITH PETROLEUM BASE FUELS.

4,191,700. SYNTHETIC LIQUID FUELS.

4,094,615. BLADE ATTACHMENT STRUCTURE FOR GAS TURBINE ROTOR.

4,142,831. DIMPLED COOLING PASSAGES FOR WATER COOLING A GAS TURBINE BUCKET.

4,090,810. PIN-FINNED COOLING PASSAGES FOR WATER COOLING A GAS TURBINE BUCKET.

4,093,399. TURBINE ROTOR WITH CERAMIC BLADES.

4,084,922. TURBINE ROTOR WITH PIN MOUNTED CERAMIC TURBINE BLADES.

4,111,604. BUCKET TIP CONSTRUCTION FOR OPEN CIRCUIT LIQUID-COOLED TURBINES.

4,169,694. CERAMIC ROTOR BLADE HAVING ROOT WITH DOUBLE CURVATURE.

4,212,587. IMPROVED COOLING SYSTEM FOR A GAS TURBINE USING V-SHAPED NOTCH WEIRS.

4,156,582. LIQUID-COOLED GAS TURBINE BUCKETS.

4,259,037. LIQUID COOLED GAS TURBINE BUCKETS.

4,195,474. LIQUID-COOLED TRANSITION MEMBER AND METHOD OF MANUFACTURE OF THE TRANSITION MEMBER.

4,184,797. LIQUID-COOLED TURBINE ROTOR.

4,142,836. MULTIPLE-PIECE CERAMIC TURBINE BLADES.

4,157,880. TURBINE ROTOR TIP WATER COLLECTOR.

4,113,242. RELEASABLE HIGH-PRESSURE SEAL AND METHOD OF FORMING SAME.

4,234,352. THERMOPHOTOVOLTAIC CONVERTER AND CELL FOR USE THEREIN.

4,023,921. OIL BURNER FOR $NO_X$ EMISSION CONTROL.

4,108,615. VANED ANODE FOR HIGH-INTENSITY IONIZER STAGE OF ELECTROSTATIC PRECIPITATOR.

4,093,430. APPARATUS AND METHOD FOR IONIZING GASES, ELECTROSTATICALLY CHARGING PARTICLES, AND ELECTROSTATICALLY CHARGING PARTICLES OR IONIZING GASES FOR REMOVING CONTAMINANTS FROM GAS STREAMS.

4,216,000. RESISTIVE ANODE FOR CORONA DISCHARGE DEVICES.

4,211,116. ASSEMBLY FOR AND METHOD OF SAMPLING PARTICLE-LADEN FLUIDS AND A CASCADE IMPACTOR USED THEREWITH.

4,274,587. WATER COOLED BURNER NOZZLE FOR SOLVENT REFINED COAL.

4,276,056. METHOD OF REMOVING PARTICULATE MATTER FROM PRECIPITATOR PLATE.

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4,147,890. HIGH VOLTAGE OVERHEAD ELECTRICAL TRANSMISSION CABLE PROTECTED FROM WET ENVIRONMENT CORONA LOSSES.

4,277,745. PERSONAL ELECTRIC FIELD EXPOSURE MONITOR.

4,262,319. LIGHTNING ARRESTER FOR USE IN GAS INSULATED ELECTRICAL POWER DEVICE.

4,179,582. HIGH VOLTAGE HIGH CURRENT CABLE TERMINAL WITH DUAL GRADING CAPACITOR STACK.

4,078,304. CUTTER FOR CORRUGATED PIPE FOR FLEXIBLE GAS INSULATED TRANSMISSION LINE.

4,063,355. CUTTER FOR HELICALLY CORRUGATED TUBE FOR FLEXIBLE GAS INSULATED CABLE.

4,091,230. EVAPORATION-COOLED TRANSMISSION LINE SYSTEM.

4,110,551. EXTRUDED SHEATH SECTION FOR COMPRESSED GAS INSULATED TRANSMISSION LINES.

4,119,793. IMPROVED TRANSMISSION LINE BREAKDOWN VOLTAGE.

4,053,338. METHOD OF FABRICATING COMPRESSED INSULATED CABLE.

4,100,367. MULTIPLE PART INSULATOR FOR FLEXIBLE GAS-INSULATED TRANSMISSION LINE CABLE.

4,122,298. OFFSET CONSTANT THICKNESS WEB FOR INSULATOR SUPPORT DISK.

4,056,679. SODIUM FILLED FLEXIBLE TRANSMISSION CABLE.

4,101,730. TERMINATION FOR STRANDED CABLE.

4,150,480. SELF-CONTAINED FLEXIBLE BUS REEL ASSEMBLY.

4,164,243. WELDED JOINT IN SEGMENTED SHEATH FOR COMPRESSED GAS INSULATED TRANSMISSION LINES.

4,256,254. WELDED JOINT IN SEGMENTED SHEATH FOR COMPRESSED GAS INSULATED TRANSMISSION LINE.

4,241,233. METHOD OF FORMING DIELECTRIC MATERIAL FOR ELECTRICAL CABLE AND RESULTING STRUCTURE.

4,097,682. MEANS FOR PROTECTING UNDERGROUND ELECTRICAL EQUIPMENT FROM THERMAL RUNAWAY.

4,095,041. MULTIPLE PART INSULATOR FOR FLEXIBLE GAS-INSULATED TRANSMISSION LINE CABLE.

4,140,337. HERMETIC QUICK CONNECTION AND SEAL FOR COUPLING LOW-PRESSURE SYSTEM.

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4,086,645. REPULSION COIL ACTUATOR FOR HIGH SPEED HIGH POWER CIRCUITS.

4,164,772. AC FAULT CURRENT LIMITING CIRCUIT.

4,224,491. CHEMICALLY ACTIVATED SWITCH.

4,171,474. CURRENT INTERRUPTER ELECTRODE CONFIGURATION.

4,250,365. CURRENT INTERRUPTER FOR FAULT CURRENT LIMITER AND METHOD.

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4,267,415. IMPROVED CURRENT LIMITER VACUUM ENVELOPE.

4,158,864. IMPROVED FAULT CURRENT LIMITER.

4,192,981. STRUCTURALLY IMPROVED ROD ARRAY VACUUM INTERRUPTER.

4,215,255. VACUUM ARC SWITCHING DEVICE WITH INTERNAL SHIELDING.

4,276,455. VACUUM ENVELOPE FOR CURRENT LIMITER.

4,058,373. COMBUSTIBLE GAS-IN-OIL DETECTOR.

4,180,483. A METHOD FOR FORMING ZINC OXIDE-CONTAINING CERAMICS BY HOT PRESSING AND ANNEALING.

4,223,366. GAPLESS SURGE ARRESTER.

4,112,362. METHOD FOR THE NONDESTRUCTIVE TESTING OF VOLTAGE LIMITING BLOCKS.

4,173,039. CURRENT BASED POWER SUPPLY.

4,278,832. METHOD AND MEANS OF CLEANING GAS INSULATED ELECTRICAL APPARATUS.

4,156,176. VOLTAGE REGULATOR UTILIZING A STATIC VAR GENERATOR.

4,273,978. LIQUID INTERRUPTER MODULE.

4,229,627. GAS PUFFER TYPE CURRENT INTERRUPTER AND METHOD.

4,250,364. VACUUM ARC CURRENT LIMITER WITH OSCILATING TRANSVERSE MAGNETIC FIELD AND METHOD.

4,224,550. ROD ARRAY VACUUM DEVICE.

4,179,927. TEMPERATURE SENSING DEVICE.

4,227,619. AN AMORPHOUS ALLOY WITH HIGH MAGNETIC INDUCTION AT ROOM TEMPERATURE.

4,233,843. METHOD AND MEANS FOR MEASURING USING ACOUSTICAL RESONATORS.

4,272,411. METAL OXIDE VARISTOR AND METHOD.

4,079,403. THYRISTOR DEVICE WITH SELF-PROTECTION AGAINST BREAKOVER TURN-ON FAILURE.

4,144,541. LIGHT-ACTIVATED SEMICONDUCTOR DEVICE PACKAGE UNIT.

4,219,833. MULTIGATE LIGHT FIRED THYRISTOR AND METHOD.

4,207,583. MULTIPLE GATED LIGHT FIRED THYRISTOR WITH NON-CRITICAL LIGHT PIPE COUPLING.

4,131,905. PACKAGE FOR LIGHT-TRIGGERED THYRISTOR.

4,207,587. PACKAGE FOR LIGHT-TRIGGERED THYRISTOR.

4,126,825. ELECTRONIC CURRENT TRANSDUCER FOR HIGH VOLTAGE TRANSMISSION LINE.

4,087,701. TRANSFORMER CASCADE FOR POWERING ELECTRONICS ON HIGH VOLTAGE TRANSMISSION LINES.

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4,257,058. PACKAGE FOR RADIATION TRIGGERED SEMICONDUCTOR DEVICE AND METHOD.

4,268,850. FORCED VAPORIZATION HEAT SINK FOR SEMICONDUCTOR DEVICES.

4,042,774. PARTICLE TRAPPING SHEATH COUPLING FOR ENCLOSED ELECTRIC BUS APPARATUS.

4,029,892. METHOD AND MEANS FOR TRAP-

PING PARTICLES IN ENCLOSED HIGH VOLTAGE ELECTRIC BUS APPARATUS.

4,029,890. PARTICLE TRAPPING ELBOW JOINT FOR ENCLOSED HIGH VOLTAGE ELECTRIC BUS APPARATUS.

4,029,891. PARTICLE TRAPPING SHEATH COUPLING FOR ENCLOSED ELECTRIC BUS APPARATUS.

4,054,835. RAPID-RESPONSE GENERATING VOLTMETER.

4,082,933. STAB CONNECTOR FOR ENCLOSED ELECTRIC BUS APPARATUS.

4,161,027. DIGITAL PROTECTION SYSTEM FOR TRANSMISSION LINES AND ASSOCIATED POWER EQUIPMENT.

4,095,205. ELECTRICAL APPARATUS.

4,117,515. OVERPRESSURE PROTECTION FOR VAPORIZATION COOLED ELECTRICAL APPARATUS.

4,145,679. VAPORIZATION COOLED AND INSULATED ELECTRICAL APPARATUS.

4,129,845. VAPORIZATION COOLED ELECTRICAL APPARATUS.

4,173,746. VAPORIZATION COOLED ELECTRICAL APPARATUS.

4,117,441. CURRENT LIMITING FUSE CONSTRUCTION AND METHOD.

4,109,228. CURRENT LIMITING FUSE WITH RESINOUS ARC-QUENCHING FILLER.

4,197,457. SYSTEM FOR DETECTING FOREIGN PARTICLES OR VOIDS IN PLASTIC MATERIAL AND METHOD.

4,208,126. SYSTEM FOR DETECTING FOREIGN PARTICLES OR VOIDS IN ELECTRICAL CABLE INSULATION AND METHOD.

4,249,051. ARC SPINNER INTERRUPTER WITH CONTACT FOLLOWER.

4,256,939. MOVING CONTACT FOR LOCALIZED GAS FLOW ARC SPINNER TYPE INTERRUPTER.

4,259,554. THIN ARC RUNNER FOR ARC SPINNER INTERRUPTER.

4,176,291. A STORED FIELD SUPERCONDUCTING ELECTRICAL MACHINE AND METHOD.

4,176,292. AN AUXILIARY FIELD WINDING FOR A SUPERCONDUCTIVE ALTERNATING CURRENT ELECTRICAL MACHINE AND METHOD OF EXCITING SAME.

4,164,672. EXTRA HIGH VOLTAGE WINDING FOR TURBINE GENERATOR.

4,195,334. HIGH VOLTAGE DC TRANSMISSION SYSTEM AND METHOD.

4,238,701. IMPROVED METHOD AND APPARATUS FOR OPERATING GENERATOR IN ITS SUPERCONDUCTING STATE.

4,096,403. IMPROVED SUPERCONDUCTING HYBRID MAGNETIC FLUX PUMP.

4,277,705. METHOD AND APPARATUS FOR COOLING A WINDING IN THE ROTOR OF AN ELECTRICAL MACHINE.

4,275,320. RADIATION SHIELD FOR USE IN A SUPERCONDUCTING GENERATOR OR THE LIKE AND METHOD.

4,117,357. FLEXIBLE COUPLING FOR ROTOR ELEMENTS OF A SUPERCONDUCTING GENERATOR.

4,120,169. MULTIPHASIC PUMP FOR ROTATING CRYOGENIC MACHINERY.

4,092,555. SLIDING SUPPORT FOR A SUPERCONDUCTING GENERATOR ROTOR.

4,151,433. SPIRAL PANCAKE WINDING FOR TWO-POLE ELECTRICAL MACHINE SPECIFICALLY TURBINE GENERATOR.

4,250,418. SUPERCONDUCTING GENERATOR AND METHOD.

4,267,473. SUPERCONDUCTING GENERATOR THERMAL RADIATION SHIELD HAVING SUBSTANTIALLY UNIFORM TEMPERATURE.

4,223,239. MULTIPHASIC PUMP FOR ROTATING CRYOGENIC MACHINERY.

4,216,498. VISIBILITY MONITOR EMPLOYING TELEVISION CAMERA.

4,049,885. CONSTRUCTION FOR SOLID ELECTROLYTE IN SODIUM SULFUR BATTERY.

4,249,052. ARC SPINNER INTERRUPTER WITH CHROMIUM COPPER ARCING CONTACT.

4,053,689. CONTACT BETWEEN METAL CAN AND CARBON GRAPHITE FIBERS IN SODIUM SULFUR CELLS.

4,070,527. EFFICIENT SODIUM SULFUR BATTERY.

3,959,022. METHOD FOR PRODUCING SODIUM-BETA-ALUMINA SOLID ELECTROLYTES.

4,012,562. MODULAR ELECTRICAL ENERGY STORAGE DEVICE.

4,048,390. NA/S CELL REACTANT CONTAINER WITH METAL ALUMINIDE COATING.

3,925,098. POSITIVE ELECTRODE FOR ELECTRICAL ENERGY STORAGE DEVICE.

4,058,396. RECOVERY OF LEAD FROM BATTERIES.

4,146,683. SODIUM SULFUR CELL CONSTRUCTION AND METHOD.

4,110,516. SODIUM SULFUR CELL CASINGS.

4,140,841. SULFUR ELECTRODE-SULFUR ELECTRODE CONTAINER AND METHODS OF MANUFACTURE.

4,220,691. A SODIUM SULFUR CELL.

4,232,098. A SODIUM SULFUR CELL COMPONENT PROTECTED BY A HIGH CHROMIUM ALLOY AND METHOD FOR FORMING.

4,162,351. METAL-HALOGEN CELL OPERATION WITH STORAGE OF HALOGEN VIA ORGANIC COMPLEXATION EXTERNAL TO THE ELECTROCHEMCIAL CELL.

4,218,521. METAL-HALOGEN BATTERY HAVING REDUCED DENDRITE GROWTH AND METHOD.

4,188,463. METHOD OF MAKING A DOUBLE CARBON MAT-COMPOSITE SULFUR ELECTRODE FOR USE IN SODIUM SULFUR CELLS.

4,189,531. NA/S REACTANT CONTAINER WITH PROTECTIVE RESIN COATING.

4,124,740. SODIUM SULFUR BATTERY.

4,131,226. SULFUR ELECTRODE CONTAINER CONSTRUCTION AND METHOD OF MANUFACTURE.

4,219,128. SULFUR ELECTRODE CONTAINER CONSTRUCTION AND METHOD OF MANUFACTURE.

4,209,573. SULFUR ELECTRODE CONTAINER AND METHODS OF MANUFACTURE.

4,189,530. SODIUM INSERT CONTAINER FOR A SODIUM-SULFUR CELL AND METHOD.

4,204,035. A SODIUM INSERT CONTAINER FOR A SODIUM-SULFUR CELL AND ITS METHOD OF USE.

4,218,524. IN-SITU PREPARATION OF THE SULFUR ELECTRODE FOR SODIUM-SULFUR BATTERIES.

4,246,325. SODIUM SULFUR BATTERY INCLUDING THERMALLY RESPONSIVE VALVE AND METHOD.

4,123,566. NA/S REACTANT AND CONTAINER WITH METAL ALUMINIDE COATING.

4,220,691. METHOD OF CONSTRUCTING THE SULFUR ELECTRODE IN A SODIUM-SULFUR CELL.

4,206,269. METAL-HALOGEN BATTERY ASSEMBLY AND METHOD OF OPERATION.

4,058,024. MULTIPLE RING INERTIAL ENERGY STORAGE WHEEL WITH IMPROVED INTER-RING CONNECTOR.

4,102,220. MULTI-RING INERTIAL ENERGY STORAGE WHEEL HAVING TAPERED RING MOUNTING MEMBERS.

4,112,785. RING ASSEMBLY FOR INERTIAL ENERGY STORAGE ROTOR.

4,176,563. INERTIAL ENERGY STORAGE ROTOR WITH TENSION-BALANCED CATENARY SPOKES.

4,161,715. METHOD AND APPARATUS FOR MEASURING THE INTERIOR DIMENSIONS OF A HOLLOW BODY.

4,150,582. ROTOR RING FOR INERTIAL ENERGY STORAGE ROTOR.

4,131,937. NATURALLY-COMMUTATED VOLTAGE-FED CONVERTER FOR LINKING A DC SOURCE TO AN AC SOURCE.

4,131,721. ELECTROLYTIC CELL HAVING A NOVEL ELECTRODE INCLUDING PLATINUM ON A CARBON SUPPORT ACTIVATED WITH PHOSPHORUS-OXYGEN-CONTAINING COMPOUND.

4,112,705. FUEL FIRED SUPPLEMENTARY HEATER FOR HEAT PUMP.

4,042,012. HEAT PUMP SYSTEM AND IMPROVED HEAT TRANSFER.

4,137,798. TWO-SPEED DRIVE APPARATUS.

4,094,165. LOSS HEAT SUPPRESSION APPARATUS AND METHOD FOR HEAT PUMP.

4,191,023. FUEL FIRED SUPPLEMENTARY HEATER FOR HEAT PUMP.

4,142,576. HEAT PUMP SYSTEM AND IMPROVED HEAT TRANSFER.

4,190,126. APPARATUS FOR DEFROSTING LOW TEMPERATURE HEAT EXCHANGER.

4,200,491. NUCLEAR REACTOR FUEL ELEMENT.

4,102,175. RESPONSE TIME VERIFICATION OF IN SITU HYDRAULIC PRESSURE SENSORS IN A NUCLEAR REACTOR.

4,154,361. QUICK OPENING PRESSURE RELEASE DEVICE AND METHOD.

4,262,539. DRIVE ASSEMBLY FOR PROBE CARRIER.

4,248,092. METHOD AND APPARATUS FOR EFFICIENTLY GENERATING ELASTIC WAVES WITH A TRANSDUCER.

4,235,110. APPARATUS AND METHOD FOR MEASURING THE CREVICE GAP CLEARANCE IN A HEAT EXCHANGER.

4,210,028. METHOD AND APPARATUS FOR ULTRASONICALLY MEASURING CONCENTRATIONS OF STRESS.

4,127,035. AN ELECTROMAGNETIC TRANSDUCER.

4,170,142. A LINEAR TRANSDUCER ARRAY AND METHOD FOR BOTH PULSE-ECHO AND HOLOGRAPHIC ACOUSTIC IMAGING.

4,179,683. METHOD AND APPARATUS FOR ENERGIZING AN ARRAY OF ACOUSTIC TRANSDUCERS TO ELIMINATE GRATING LOBES.

4,199,258. DISTANCE MEASURING DEVICE AND METHOD.

4,120,752. MIXED OXIDE FUEL PELLET FOR FUEL ROD OF NUCLEAR REACTOR CORE.

4,261,934. METHOD FOR HOMOGENIZING MIXED OXIDE NUCLEAR FUELS.

4,030,347. BIAXIAL CAPACITANCE STRAIN TRANSDUCER.

4,151,747. MONITORING ARRANGEMENT UTILIZING FIBER OPTICS.

4,147,982. TURBINE GENERATOR GROUND CURRENT ARCING DETECTION APPARATUS AND METHOD.

4,271,462. POWER CONVERTER AND REGULATION APPARATUS.

4,203,069. METHOD AND APPARATUS FOR NON-DESTRUCTIVELY TESTING ELECTRICALLY CONDUCTIVE COMPONENTS WITH EDDY CURRENT.

4,190,895. METHOD AND APPARATUS FOR ROTATING CARTESIAN COORDINATE SIGNALS.

4,203,326. METHOD AND MEANS FOR IMPROVED OPTICAL TEMPERATURE SENSOR.

4,201,092. METHOD OF DETECTING AND MONITORING A LEAK CRACK CAUSED BY A THROUGH WALL CRACK IN A HIGH PRESSURE FLUID SYSTEM.

4,236,971. APPARATUS FOR SEALING A ROTATABLE PLUG IN A NUCLEAR REACTOR.

4,257,480. HEAT EXCHANGER AND METHOD.

4,257,356. HEAT EXCHANGING APPARATUS AND METHOD.

4,158,602. METHOD AND APPARATUS FOR CONTROLLING THE NEUTRON

FLUX IN NUCLEAR REACTORS.

4,227,967. METHOD AND APPARATUS FOR REDUCING THE POWER LEVEL IN A NUCLEAR REACTOR DURING TEMPERATURE TRANSIENT.

4,278,559. METHOD FOR PROCESSING SPENT NUCLEAR REACTOR FUEL.

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The libraries listed herein, designated as patent depository libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent months or years in some libraries to all or most of the patents issued since 1870, or earlier, in other libraries.

These patent collections are open to public use and each of the patent depository libraries, in addition, offers the publications of the patent classification system (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

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**CONDITION OF PATENT APPLICATIONS AS OF October 31, 1981**

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—D. E. TALBERT, Director ..... Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metallurgical Apparatus; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 6-23-80 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—C. E. VAN HORN, Director ..... Heterocyclic Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 12-06-79 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—J. O. THOMAS, JR., Director .... Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g., Coating; Molding; Ink; Prosthdontics; Adhesive and Abrading Compositions; Molding, Shaping, Treating Process, and Apparatus Therefor; Irradiation (Part); Bleaching; Dyeing; Leather, Fur and Textile Treating Compositions. | 9-15-80 |
| COATING, LAMINATING AND PHOTOGRAPHY, GROUP 160—S. N. ZAHARNA, Director ..... Coating: Processes, Apparatus and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; and Photography. | 11-14-80 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—R. F. WHITE, Director ..... Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 9-17-80 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—S. W. ENGLE, Director Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Horology; Acoustics; Recorders; Weighing Scales. | 4-4-80 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—KENNETH L. CAGE, Director ..... Ordnance, Firearms and Ammunition; Lubrication; Illumination; Nuclear Reactors; Acoustics, Communications, Optics; Radar; Directional Radio; Torpedoes; Seismic Exploring; Cathode Ray Tube Circuitry; Cryptography; Laser Devices; Radioactive Materials; Powder Metallurgy, Rocket Fuels; Special, Fuel, Explosive and Thermic Compositions; Thermal and Photoelectric Batteries. | 6-03-80 |
| INFORMATION TRANSMISSION, STORAGE, AND RETRIEVAL, GROUP 230—VACANT ..... Communications; Multiplexing Techniques; Television; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 2-05-80 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—A. L. SMITH, Director ..... Receptacles; Bearings; Joint Packing; Conduits; Switches; Presses; Plumbing Fixtures; Textile Spinning; Cleaning; Food Treating; Agitating; Centrifugal Separating; Geometrical Instruments; Sound Recording; Image Projectors; Web Feeding; Winding and Reeling; Cable Hoists; Measuring and Testing; Indicating; Fluent Material Handling. | 9-15-80 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—S. S. MATTHEWS, Director ..... Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 8-06-79 |
| DESIGN, GROUP 290—KENNETH L. CAGE, Director ..... Industrial Arts; Household, Personal and Fine Arts. | 3-04-80 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director ..... Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 4-11-80 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—M. M. NEWMAN, Director ... Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion-Bonding, Metal Founding; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks; Fishing, Etc.; Butchering; and Books and Printed Matter. | 6-03-80 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—R. E. AEGERTER, Director ..... Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Plants; Harvesting; Earth Working and Excavating; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Information Dissemination. | 5-06-80 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—D. J. STOCKING, Director ..... Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Couplings; Gearing; Fluid Handling and Control; Lubrication. | 2-19-80 |
| GENERAL CONSTRUCTIONS, TEXTILES, MINING AND GEARING, GROUP 350—G. M. FORLENZA, Director ..... Building Structures; Racks; Cabinets; Closures; Supports; Furniture; Fasteners; Locks; Pipe Couplings; Joints; Miscellaneous Hardware; Textiles; Sewing Machines; Apparel; Footwear; Earth Engineering; Earth Drilling; Mining; Wells; Roads; Bridges; Tool Driving; Gearing; Machine Elements; Clutches. | 3-17-80 |

**Expiration of patents**: The patents within the range of numbers indicated below expire during October 1981, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

**Patents** ..... Numbers 3,151,329 to 3,154,786, inclusive

**Plant Patents** ..... Numbers 2,449 to 2,450, inclusive

# DEFENSIVE PUBLICATIONS

## PUBLISHED DECEMBER 1, 1981

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

### T101,301
### METHOD FOR BLASTING ROCK

**Per-Anders Persson, Vinterviken, S-117 48 Stockholm; Roger Holmberg, Eldstigen 23, S-140 41 Sorunda, and Gunnar Nord, Love Almqvists väg 84, S-191 44 Sollentuna, all of Sweden**

**PCT No. PCT/SE78/00105, § 371 Date Sep. 2, 1979, § 102(e) Date Dec. 28, 1978, PCT Pub. No. WO79/0047/. PCT Pub. Date Jul. 26, 1979.**

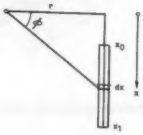
**This PCT application filed Sep. 2, 1979, Ser. No. 154,420**

**Claims priority, application Sweden, Jan. 2, 1978, 7800039**

**Int. Cl.[3] F42B *00/00***

**U.S. Cl. 102—308**

**5 Sheets Drawing. 12 Pages Specification**



Method of blasting rock to attain a predetermined fracture result. The necessary energy for the blasting is provided at an amount and in an application which is decided by calculating the stresses with regard to previously plotted blasting effects and to a previously prepared description of the rock structure.

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### T101,302
### SELECTIVE REACTIVE ION ETCHING OF POLYCRYSTALLINE SILICON AGAINST MONOCRYSTALLINE SILICON

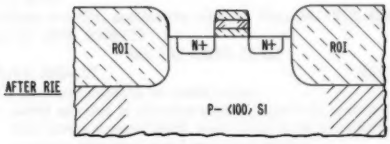
**Lawrence E. Forget, Robert Rd., Poughkeepsie, N.Y. 12603; Robert A. Gdula, Campbell Hall Farm, Campbell Hall, N.Y. 10916, and Joseph C. Hollis, Beach Rd., Poughquag, N.Y. 12570**

**Continuation of Ser. No. 130,892, Mar. 17, 1980, abandoned. This application Mar. 30, 1981, Ser. No. 249,254**

**Int. Cl.[3] H01L *21/308***

**U.S. Cl. 156—643**

**1 Sheets Drawing. 16 Pages Specification**




An improved Reactive Ion Etching (RIE) technique for preferentially etching polysilicon is described as is needed in Very Large Scale Integration (VLSI) using silicon technology. The etch gas is a mixture of carbon tetrafluoride ($CF_4$) and chlorine ($Cl_2$) diluted with inert gas. The pressure of the system is required to be in the range of about 10 to 500 milli Torr. This etch gas allows an RIE process which combines the very desirable features of selectivity (high polycrystalline silicon/-monocrystalline silicon etch rate ratio) and directionality which creates substantially vertical sidewalls on the etched features.

### T101,303
### PROCESS FOR CASTING POLYURETHANE ARTICLES

**Francis O'Shaughnessy, 5875 Honeysuckle Dr., Beaumont, Tex. 77706**

**Filed Mar. 2, 1981, Ser. No. 239,187**

**Int. Cl.[3] B29C *5/00***

**U.S. Cl. 264—28**

**No Drawing. 13 Pages Specification**

A mixture of isocyanate-terminated polyurethane prepolymer made from an aliphatic diisocyanate and an approximately stoichiometric amount of a curing aromatic diamine is stored at least −5° to −25° C. until needed. It then is reheated to about 80°–120° C., at which temperature it becomes fluid and pourable. Within this temperature range the mixture has a useful life of at least about 30 minutes. Large batches of prepolymer-curing agent mixture can be prepared using existing processing equipment and techniques, analyzed and stored, then reheated and used for casting of very large articles.

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### T101,304
### VISCOSITY REDUCING AGENTS FOR CHOCOLATE COATING COMPOSITIONS

**Jay C. Musser, 214 Marietta Ave., Mount Joy, Pa. 17552**

**Filed Apr. 3, 1980, Ser. No. 136,863**

**Int. Cl.[3] A23G *3/00***

**U.S. Cl. 426—611**

**No Drawing. 17 Pages Specification**

Disclosed are combinations of lecithin and diacetyl tartaric acid esters of monoglycerides used in chocolate coating compositions to lower the viscosity thereof when in liquid form. Use of these substances does not adversely affect the physical properties such as gloss, softness, taste, etc.

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### T101,305
### 3[(3-ALKYLAMINO-2-HYDROXYPROPOXY)PHENYL]-1,2-PROPANEDIOLS

**Joseph W. Epstein, 19 Briarwood Ave., Monroe, N.Y. 10950; Leon Goldman, 126 Grandview Ave., Nanuet, N.Y. 10954, and James D. Warren, 40 W. Nauraushaun Ave., Pearl River, N.Y. 10965**

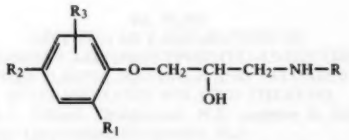
**Continuation of Ser. No. 90,966, Nov. 5, 1979, abandoned. This application Aug. 28, 1980, Ser. No. 182,280**

**Int. Cl.[3] C07C *93/06***

**U.S. Cl. 564—349**

**No Drawing. 30 Pages Specification**

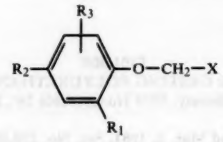
This invention concerns novel 3-[(3-alkylamino-2-hydroxypropoxy)phenyl]-1,2-propanediols of the formula:



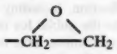

wherein R is selected from the group consisting of straight or branched-chain lower alkyls ($C_1$–$C_6$) and cycloalkyls ($C_1$–$C_6$); $R_1$ and $R_2$ are selected from the group consisting of hydrogen and 2,3-dihydroxypropyl, with the proviso that $R_1$ and $R_2$ may not be the same; and $R_3$ is selected from the group consisting of lower alkyls ($C_1$–$C_4$) and lower alkoxys ($C_1$–$C_4$); and the acid

addition salts thereof. These novel compounds are useful as antiarrhythmic agents and β-andrenergic blockers in mammals.

This invention also concerns novel compounds of the formula




wherein $R_1$ and $R_2$ are selected from the group consisting of hydrogen and 2,3-dihydroxypropyl, with the proviso that $R_1$ and $R_2$ may not be the same; $R_3$ is selected from the group consisting of lower alkyls ($C_1$–$C_4$) and lower alkoxys ($C_1$–$C_4$); and X is selected from the group consisting of




and —CHOH—$CH_2$—Z (or a mixture of these compounds wherein X has both meanings stated above) where Z may be halogen, alkoxy sulfonyl and aryloxysulfonyl; and the acid-addition salts thereof. These compounds are useful as intermediates for the preparation of the active antiarrhythmic and β-andrenergic blocking compounds described above.

This invention also concerns a process for preparing said antiarrhythmic and β-andrenergic blocking compounds from said intermediates.

# REISSUES

## DECEMBER 1, 1981

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

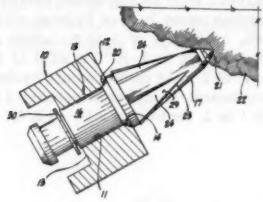
### Re. 30,807
### POINT-ATTACK BIT

**Gerald W. Elders, 38 Yakashba Estates, Prescott, Ariz. 86301**

**Original No. 4,065,185, dated Dec. 27, 1977, Ser. No. 707,647, Jul. 22, 1976. Application for reissue Dec. 17, 1979, Ser. No. 104,099**

**Int. Cl.³ E21C** *35/18*

**U.S. Cl. 299—86** **11 Claims**



*11. A point-attack bit for removing material from a mine face, comprising:*

*(a) an elongate shank,*

*(b) a head integral and coaxial with the shank, the head including projecting vanes extending generally longitudinally of the bit, each vane having a leading end and a trailing end and having relatively diverging sides that extend from the leading end to the trailing end, and contact with material being mined to effect a positive turning of the bit upon picking of the mine face, and*

*(c) said sides having different included angles with respect to a plane passed through said leading end and the longitudinal axis of the bit.*

---

### Re. 30,808
### FILM-TRANSPORT CONTROL FOR SOUND-FILM CAMERA

**Otto Freudenschuss; Otto Kantner, and Peter R. von Belvard, all of Vienna, Austria, assignors to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria**

**Original No. 4,037,947, dated Jul. 26, 1977, Ser. No. 669,084, Mar. 22, 1976. Continuation-in-part of Ser. No. 460,136, Apr. 11, 1974, abandoned. Application for reissue Feb. 6, 1979, Ser. No. 9,792**

**Claims priority, application Austria, May 24, 1973, 4565/73; May 21, 1975, 3906/75**

**Int. Cl.³ G03B** *31/02*

**U.S. Cl. 352—27** **20 Claims**

*15. In a cine camera, in combination:*

*a casing adapted to accommodate a perforated motion-picture film having a sound track, said casing being provided with an exposure gate and sound-recording means;*

*electrically powered drive means in said casing for transporting said film past said exposure gate and said sound-recording means, said drive means including a reciprocable traction claw engageable with the film perforations in the vicinity of said exposure gate and further including a continuously rotatable capstan and a pinch roller adapted to clamp said film therebetween in the vicinity of said sound-recording means;*

*relatively displaceable support means for said pinch roller and said capstan, said support means including a movable first member determining the relative spacing of said pinch roller and said capstan;*

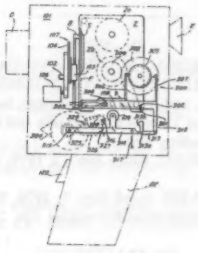
*a second member movable relatively to said first member;*

*first biasing means coupled with said movable members and effective in a predetermined position of said second member for urging said first member from an inactive position into an active position in which the film is clamped between said capstan and said pinch roller;*

*latch means engageable with said first member for releasably retaining same in said inactive position;*

*actuating means for energizing said drive means, said latch means being operatively linked with said drive means for releasing said first member at the start of a picture-taking operation;*

*restoring means controlled by said actuating means for displacing said second member from said predetermined position to an alternate position upon de-energization of said drive means to facilitate a return of said first member to said inactive position;*



*second biasing means connected with said first member for re-engaging same with said latch means upon displacement of said second member to said alternate position; and*

*cam means mechanically coupled with and receiving power from said drive means for returning said second member to said predetermined position after the re-engagement of said first member with said latch means and before the start of a new picture-taking operation.*

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### Re. 30,809
### METHOD OF PREPARATION OF 3-(3-CARBOXY-4-HYDROXYPHENYL)-4,5-DIHYDRO-2-PHENYLBENZ [E]INDOLE AND VALUABLE INTERMEDIATES RELATED THERETO

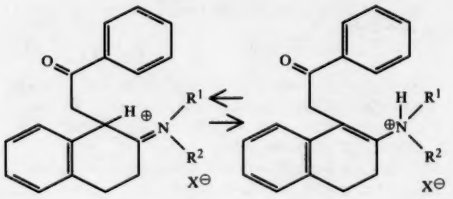
**Richard C. Effland, Bridgewater, N.J., assignor to American Hoechst Corporation, Bridgewater, N.J.**

**Original No. 4,066,659, dated Jan. 3, 1978, Ser. No. 692,331, Jun. 3, 1976. Application for reissue Aug. 13, 1979, Ser. No. 65,873**

**Int. Cl.³ C07D** *209/18*

**U.S. Cl. 260—326.13 F** **24 Claims**

*15. A method of preparing 3-(3-carboxy-4-hydroxyphenyl-4,5-dihydro-2-phenylbenz[e]indole which comprises reacting a tautomeric compound of the formula*



*wherein $R^1$ and $R^2$ are the same or different and each represents alkyl of from 1 to 6 carbon atoms or, together with the nitrogen atom to which they are attached, form a pyrrolidino or piperidino ring and X is bromide or chloride with 5-aminosalicylic acid in a solvent at a temperature of from about ambient to the boiling point of the solvent.*

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**Re. 30,810**

## CARBOFUNCTIONAL SULFUR AND CARBOXYLATE BRIDGED TIN COMPOUNDS

**Thomas G. Kugele, and Arthur F. Koeniger, both of Cincinnati, Ohio, assignors to Thiokol Corporation and Carstab Corporation, both of Reading, Ohio**

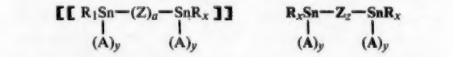
**Reissued No. Re. 30,032, dated Jun. 12, 1979, Ser. No. 940,450, Sep. 7, 1978.**

**Original No. 3,979,359, dated Sep. 7, 1976, Ser. No. 524,271, Nov. 15, 1974. Application for reissue Apr. 21, 1980, Ser. No. 141,912**

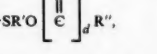
**Int. Cl.**[3] **C07F** *7/22*

**U.S. Cl. 260—429.7** **54 Claims**

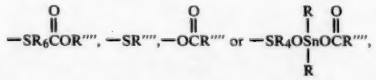
1. A sulfur containing organotin compound having the formula (1):



where R is a monovalent alkyl radical of 1 to 8 carbon atoms, A is

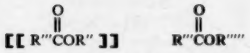


halogen of atomic weight 35 to 127,

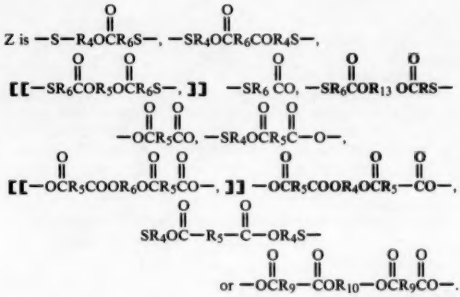


the A groups are the same or different with the proviso that at least one

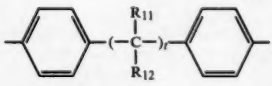
is in the molecule, d is 0 or 1, each R' when d is 0 is alkylene of 1 to 10 carbon atoms, each R' when d is 1 is alkylene of 2 to 10 carbon atoms, each R'' *when d is 1* is [hydrogen,] alkyl of 1 to 20 carbon atoms, ethylenically unsaturated aliphatic hydrocarbyl having 1 to 3 ethylenic double bonds and 2 to 19 carbon atoms, halo or hydroxy alkyl of 2 to 19 carbon atoms, halo or hydroxy alkenyl of 2 to 19 *carbon atoms*, cycloalkyl of 5 to 6 carbon atoms, benzyl, phenyl, alkylphenyl, halophenyl,



where R''' is alkylene of 2 to 10 carbon atoms, *each R'' when d is 0 is hydrogen, alkyl of 1 to 20 carbon atoms, ethylenically unsaturaed aliphatic hydrocarbyl having 1 to 3 ethylenic double bonds and 2 to 19 carbon atoms, cycloalkyl of 5 to 6 carbon atoms, benzyl, phenyl or halophenyl,* R'''' is alkyl of 1 to 20 carbon atoms, alkenyl of 2 to 18 carbon atoms, halo or hydroxy alkyl of 2 to 20 carbon atoms, halo or hydroxy alkenyl of 2 to 20 carbon atoms, cycloalkyl of 5 to 6 carbon atoms, benzyl, phenyl or halophenyl, each R''''' is alkyl of 1 to 20 carbon atoms, alkenyl of 2 to 18 carbon atoms, cycloalkyl of 5 to 6 carbon atoms, benzyl, phenyl or halophenyl, x is 1 or 2, y is 1 or 2 and z is 1 or 2, the total of x+y+z is 4,

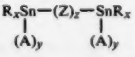


where $R_4$ is arylene, —CH=CH—, alkylene of 2 to 10 carbon atoms, $R_5$ is nothing, alkylene of 1 to 8 carbon atoms, phenylene or —CH=CH—, $R_6$ is alkylene of 1 to 10 carbon atoms, —CH=CH— or arlyene, $R_{13}$ is phenylene, alkylene of 2 to 8 carbon atoms or —CH=CH—, $R_9$ is a residue of a dicarboxylic acid from which the two carboxyl groups have been removed, $R_{10}$ is arylene or



where t is 0 to 1

and $R_{11}$ and $R_{12}$ are H or alkyl, or (2) an overbased compound prepared by reacting a dialkytin oxide of alkystannoic acid with a compound of the formula:



## Re. 30,811
## SUBSTITUTED PIPERIDINES THERAPEUTIC PROCESS AND COMPOSITIONS

**Stanley J. Dykstra, and Joseph L. Minielli, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.**

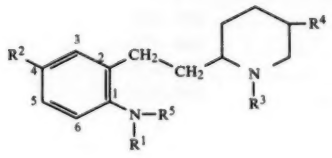
**Original No. 4,064,254, dated Dec. 20, 1977, Ser. No. 734,583, Oct. 21, 1976. Division of Ser. No. 620,907, Oct. 8, 1975, Pat. No. 4,000,143, which is a division of Ser. No. 384,341, Jul. 31, 1973, Pat. No. 3,931,195, which is a continuation-in-part of Ser. No. 120,754, Mar. 3, 1971, abandoned. Application for reissue Nov. 28, 1979, Ser. No. 98,008**

**Int. Cl.**[3] **A61K** *31/445, 31/455*

**U.S. Cl. 424—266** **22 Claims**

1. A process for eliciting an antiarrhythmic effect in a mammal in need of said effect which comprises systemic administration to said mammal of a non-toxic effective antiarrhythmic dose of from about 0.01 to 20 mg./kg. of body weight of said mammal of a compound from the group consisting of a substituted piperidine having Formula I

Formula I



wherein

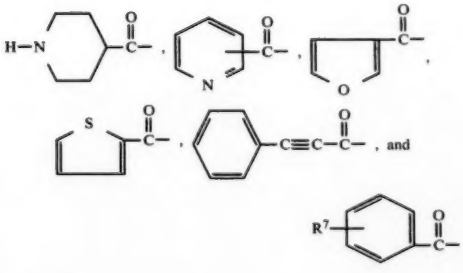
$R^1$ represents hydrogen

$R^2$ represents hydrogen or methylenedioxy attached in the benzenoid 4,5-position

$R^3$ represents hydrogen or methyl

$R^4$ represents hydrogen

$R^5$ is selected from the group consisting of lower alkanoyl of from 1 to 4 carbon atoms inclusive, lower alkanesulfonyl of from 1 to 4 carbon atoms inclusive, cinnamoyl,



wherein

$R^7$ is selected from the group consisting of hydrogen, chlorine, dimethylamino, alkylthio of from 1 to 4 carbon atoms inclusive, alkyl of from 1 to 4 carbon atoms inclusive, methoxy, 3,4-dimethoxy, 3,5-dimethoxy, and 3,4,5-trimethoxy;

and a pharmaceutically acceptable salt thereof.

## Re. 30,812
## SUBSTITUTED PIPERIDINES THERAPEUTIC PROCESS AND COMPOSITIONS

**Stanley J. Dykstra, and Joseph L. Minielli, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.**

**Original No. 4,064,254, dated Dec. 20, 1977, Ser. No. 734,583, Oct. 21, 1976. Division of Ser. No. 620,907, Oct. 8, 1975, Pat. No. 4,000,143, which is a division of Ser. No. 384,341, Jul. 31, 1973, Pat. No. 3,931,195, which is a continuation-in-part of Ser. No. 120,754, Mar. 3, 1971, abandoned. Application for reissue Nov. 28, 1979, Ser. No. 98,007**

**Int. Cl.**[3] **A61K** *27/00*, **C07D** *211/00*

**U.S. Cl. 546—193** **1 Claim**

*21. 4-Hydroxy-2'-[2-(1-methyl-2-piperidyl)ethyl]benzanilide.*

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## Re. 30,813
## INTERMITTENCE-RESPONSIVE WORKING-TIME INDICATOR

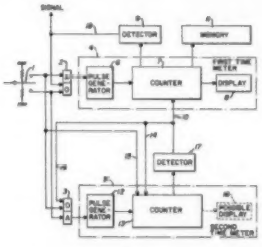
**Erik E. Forsslund, Alegghalde 2, CH-6045 Meggen, Switzerland**

**Original No. 4,049,952, dated Sep. 20, 1977, Ser. No. 682,862, May 3, 1976. Application for reissue Sep. 12, 1979, Ser. No. 75,174**

**Claims priority, application Sweden, May 16, 1975, 7505631**

**Int. Cl.**[3] **G06M** *3/02*; **G07C** *3/04*

**U.S. Cl. 235—92 T** **7 Claims**




1. An intermittence-responsive working-time indicator comprising in combination

I. a first time meter operative as a working-time meter and including

a. means for measuring and indicating the duration of a single period between a start pulse and a subsequent stop pulse supplied to said first meter *and for measuring and indicating said period* as well as the total duration of an arbitrary number *greater than zero* of interspaced such periods while neglecting the intervals between them, and

b. means for resetting said first time meter [to a zero position] at the receipt of a resetting pulse,

II. a second time meter operative as an idling-time meter and including

a. means for measuring the idling-time following immediately after each stop pulse to said first time meter, and

b. means for resetting said second time meter [to a zero position] at the receipt of a resetting pulse [through either one of two separate reset inputs thereof],

III. means for comparing the idling-time measured by said second time meter with a [stored] *reference* value and for supplying a pulse *at least* to said resetting means of the first time meter [as well as to one of said separate reset inputs of said resetting means of the second time meter] at the very moment when the measured idling-time equals said [stored] *reference* value,

IV. [means for supplying a resetting pulse to the other one of said separate reset inputs of said resetting means of the second time meter at the receipt of each start pulse to said first time meter, and

V.] means for starting the operation of said second time meter whenever a stop pulse is received by said first time meter, and for stopping the operation [thereof whenever it has become properly reset by a resetting pulse supplied to either one of its reset inputs] *of said second time meter whenever a start pulse is received by said first time meter, and*

*V. means connected to said resetting means of the second time meter for supplying a resetting pulse thereto before said second time meter is actuated to start measuring the duration of each new idling-time period.*

# PATENTS

## GRANTED DEC. 1, 1981

### ERRATA

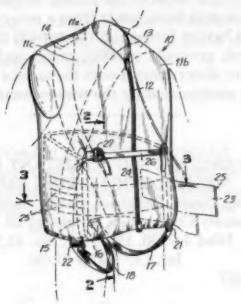
| For CLASS | See PATENT NO. |
|---|---|
| 411–010 | 4,303,001 |
| 501–035 | 4,303,446 |
| 501–103 | 4,303,447 |
| 501–129 | 4,303,448 |
| 501–128 | 4,303,449 |
| 376–150 | 4,303,473 |
| 376–175 | 4,303,474 |
| 376–394 | 4,303,475 |
| 376–446 | 4,303,476 |
| 427–297 | 4,303,726 |
| 525–398 | 4,303,777 |

# PATENTS

## GRANTED DECEMBER 1, 1981

## GENERAL AND MECHANICAL

**4,302,847**
**BODY PROTECTIVE CLOTHING**
**Bertrand H. Miles, 788 Columbus Ave., New York, N.Y. 10025**
**Filed Sep. 20, 1979, Ser. No. 77,518**
**Int. Cl.³ A41D** *13/00*
**U.S. Cl. 2—2** **12 Claims**



1. A protective garment for protecting the lower back and hip regions of a user from injuries due to impact while participating in active sports and not interfering with such participation, comprising:

a garment shell formed from a rugged-flexible cloth material having an inner panel shaped to cover at least the lower back and hip regions of the user and a cooperating outer panel joined to said inner panel for forming a substantially elongated pocket therebetween extending across the torso of the user;

a flexible-impact resistant foam insert shaped to fit into said pocket inserted into said pocket;

shoulder means for supporting said garment with the flexible foam inserts surrounding the lower back and hip regions by hanging from the shoulders of the user;

adjustable closure means across the front of the user for adjustably closing and securing said flexible foam insert in said pocket about the lower back and hip region of the user and

adjustable crotch straps means adjustably anchored across the lower portion of the garment for fixing the position of the garment vertically on the user.

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**4,302,848**
**METHOD FOR WEARING AND TAKING OFF PROTECTIVE SUIT**
**Katsuyuki Otsuka, Mito; Jin Ohuchi, Tokai, and Shizuo Arita, Tokyo, all of Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan and Fujikura Rubber Works, Ltd., both of Tokyo, Japan**
**Filed Apr. 8, 1980, Ser. No. 138,362**
**Claims priority, application Japan, Apr. 9, 1979, 54-42900**
**Int. Cl.³ A41D** *13/00*
**U.S. Cl. 2—2** **2 Claims**

1. A method for wearing and taking off a protective suit which is used when a worker enters the inside of a working zone segregated from the outside thereof, characterized in that said protective suit has a cylindrical portion made of a film-like fusible material, with one end of said cylindrical portion being joined to the protective suit so that the worker can get into or out of the suit by passing through said cylindrical portion;

that, when wearing the protective suit, the worker gets into the suit by passing through said cylindrical portion, with the other end of the cylindrical portion being kept joined to an entrance/exit section provided in a wall which segregates the inside of the working zone from the outside thereof, and then at least one part of the cylindrical portion is fused and closed to segregate the inside of the suit from the outside thereof, and then the cylindrical portion is cut so as to maintain the segregation between the inside and outside of the working zone as well as the inside and outside of the protective suit, thereby providing a pouch-like portion formed by a part of the cylindrical portion to seal the entrance/exit section and separating the protective suit carrying the residual part of the cylindrical portion from the entrance/exit section; and

that, when taking off the protective suit, the cylindrical portion on the protective suit side and the pouch-like portion on the entrance/exit section side are superposed one on the other and fused at the superposed portion provided with an anti-fusion tape applied on the interior side of the cylindrical portion and, after cutting the fused portion, the worker gets out of the suit by passing through that part of the cylindrical portion which has not been fused owing to the presence of said anti-fusion tape.

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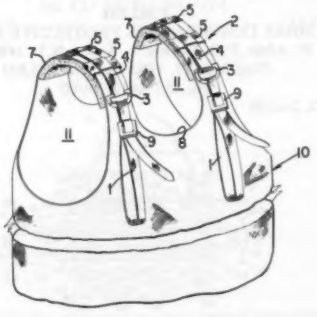
**4,302,849**
**ARM SUPPORT DEVICE**
**Desmond W. Margetson, 515 W. 122nd St., New York, N.Y. 10027**
**Filed Jan. 29, 1980, Ser. No. 116,462**
**Int. Cl.³ A61F** *5/02;* **A41B** *1/00*
**U.S. Cl. 2—115** **8 Claims**



1. An upper body covering for running comprising a fabric device having two armholes, a bottom opening, a neck opening, and two strap loops, one end of each strap loop being attached to the upper body covering at a point laterally adjacent to said neck opening by an attachment means affixed to the upper body covering said attachment means comprising a ring onto which the strap loop is looped, a member to which the ring is secured, and two or more cross-members sewn to

the upper body covering the cross-members being reinforced on the underside of the upper body covering.

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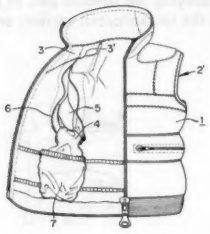
**4,302,850**
**VEST WITH SLEEVES**

**Selichi Maeshima, Nara, Japan, assignor to Descente Ltd., Osaka, Japan**

**Filed Jun. 29, 1979, Ser. No. 53,278**
**Claims priority, application Japan, Nov. 21, 1978, 53-159508[U]**
**Int. Cl.³ A41B *1/04***
**U.S. Cl. 2—102** **5 Claims**




1. A garment comprising:
a vest having arm holes formed therein and having first and second shoulder portions, each of said first and second shoulder portions including inner central portions;
a pair of reversible sleeves; and
means for attaching said pair of reversible sleeves to the vest within said arm holes formed within said vest and to said inner central portions of said first and second shoulder portions, each of said pair of sleeves further comprising a closable opening means formed therein exclusively along the length of each sleeve adjacent said first and second shoulder portions of the vest for allowing passage of a lower part of each of said pair of sleeves through said opening means and stowing inside said vest such that each of said pair of sleeves is reversible while still being worn by the wearer of the vest and such that each of said pair of sleeves is completely concealed when stowed inside said vest.

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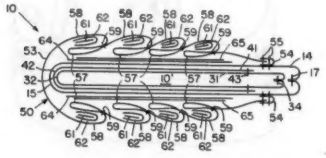
**4,302,851**
**HIGH TEMPERATURE PROTECTIVE MITT**

**Robin W. Adair, P.O. Drawer A, Avoca, N.Y. 14809**

**Filed May 27, 1980, Ser. No. 153,831**
**Int. Cl.³ A41D *19/00***
**U.S. Cl. 2—158** **14 Claims**




1. A protective mitt for use when handling hot products, comprising
an enclosed hand section having in one end a first opening for permitting the insertion of a person's hand into the hand section, and having a second opening therein through which a person's thumb may project,
a generally tubular thumb section closed at its outer end, and connected around its inner end to said second opening in said hand section to enclose a thumb projecting from said second opening,
each of said sections comprising an inner layer of fabric disposed to be in direct contact with a person's hand and thumb, respectively, and an outer layer of non-combustible fabric surrounding said inner layer,
a first flexible pad secured to and overlying part of said thumb section intermediate its ends, and
a second flexible pad secured to and overlying at least the side of said hand section which is disposed to register with and cover the palm of the person wearing the mitt,
each of said pads being made from a non-combustible material, and having formed on the outside thereof a plurality of spaced, generally parallel, raised surfaces disposed to come into direct contact with the surface of a product that is being manipulated by the person wearing the mitt.

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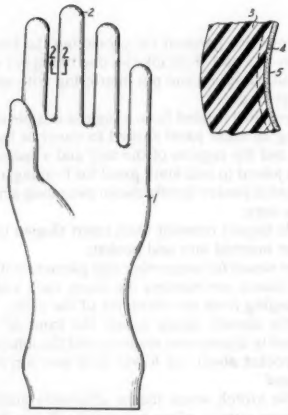
**4,302,852**
**HYPOALLERGENIC SLIP RESISTANT GLOVES AND METHODS OF MAKING SAME**

**John J. Joung, South Pasadena, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.**

**Filed Jul. 30, 1979, Ser. No. 61,788**
**Int. Cl.³ A41D *19/00***
**U.S. Cl. 2—167** **30 Claims**




1. A hypoallergenic surgeon's glove comprising: an outer support glove of a first elastomer containing an allergenic material; an inner barrier glove of a second non-allergenic elastomer secured by covalent chemical bonds to an inner surface of the support glove, wherein the inner barrier glove requires an amount of lubricating donning powder substantially less than that for donning a glove of the first elastomer, whereby sharp angular flexing in the knuckle area, as well as stretching and snapping during donning, does not delaminate the gloves nor interfere with the barrier glove's isolation of allergenic material from a surgeon's hand.

12. A method of making a hypoallergenic surgeon's glove comprising the steps of:
(a) forming a support glove of a first elastomer containing an allergenic material;
(b) attaching a barrier glove of a second non-allergenic elastomer to an exterior of the support glove, wherein the barrier glove requires an amount of lubricating donning powder substantially less than that for donning a glove of the first elastomer;
(c) bonding the two gloves together by covalent chemical bonds;
(d) curing the barrier glove; and
(e) everting the two gloves so that the barrier glove is inside

the support glove, whereby sharp angular flexing in the knuckle area, as well as stretching and snapping during donning, does not delaminate the glove nor interfere with the barrier glove's isolation of allergenic material from a surgeon's hand.

**30**. A method of reducing the amount of lubricating powder required on a surgeon's glove comprising: chemically securing a barrier glove of silicone elastomer to an outer support glove of a first elastomer containing an allergenic material, whereby sharp angular flexing in the knuckle area, as well as stretching and snapping during donning, does not delaminate the gloves nor interfere with the barrier glove's isolation of allergenic material from a surgeon's hand.

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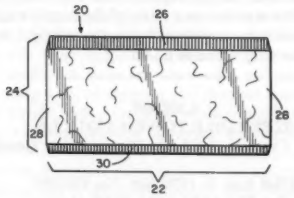
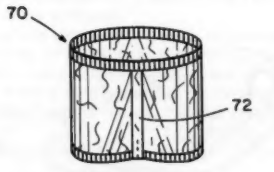
**4,302,853**

## DISPOSABLE UNDERGARMENT

**Frederick K. Mesek, Oak Forest, Ill., assignor to Johnson & Johnson Baby Products Company, New Brunswick, N.J.**

**Filed May 27, 1980, Ser. No. 153,376**
**Int. Cl.³ A41B *9/04***
**U.S. Cl. 2—402** **18 Claims**




**1**. A unitary disposable undergarment suitable for use in training infants, constructed from at least one layer of a non-woven fabric having throughout its area discontinuous micropleats, said fabric being substantially rectangular in shape having longer side margins and shorter end margins, said micropleats extending generally parallel to said end margins, one of said side margins forming a waist encircling portion by joining one end margin of the other end margin, the other of the said side margins containing an elastomeric member forming leg openings by joining all layers of non-woven fabric together in the crotch area.

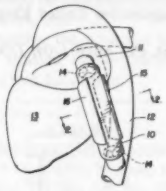
**14**. A unitary, multilayer, disposable undergarment suitable for use in training infants or by incontinent children or adults constructed from a non-woven stretchable fabric, said fabric being substantially rectangular in shape having longer side margins and shorter end margins, one of said side margins forming a waist encircling portion by joining one end margin to the other end margin, the other of said margins forming leg openings by joining all layers of non-woven fabric together in the crotch area, said undergarment having a moisture-pervious inner layer of stretchable fabric adapted to contact the wearer's skin, a moisture-impervious stretchable outer layer and an intermediate liquid absorbent panel disposed therebetween, said undergarment having gathering means associated with the waist encircling portion and the leg openings.

**4,302,854**

## ELECTRICALLY ACTIVATED FERROMAGNETIC/DIAMAGNETIC VASCULAR SHUNT FOR LEFT VENTRICULAR ASSIST

**Thomas M. Runge, 2501 Galewood Pl., Austin, Tex. 78703**

**Filed Jun. 4, 1980, Ser. No. 156,510**
**Int. Cl.³ A61F *1/24*; A61M *1/03***
**U.S. Cl. 3—1.7** **3 Claims**



**1**. A cardiac assist device comprising a valved compressible tubular shunt adapted for connection between a chamber of the heart and a coacting blood vessel, a pair of opposing shunt compressing plates of elongated form mounted on opposite sides of the shunt and extending lengthwise of the shunt for a major portion of its length between valves of the shunt, an electromagnetic actuator for the device adapted to be mounted on the exterior of the chest in lateral alignment with the shunt and said shunt compressing plates and generating an electromagnetic field in the vicinity of the shunt and shunt compressing plates, and one of the shunt compressing plates at the side of the shunt distal to said actuator being formed of ferromagnetic material and the other shunt compressing plate at the side of the shunt proximal to the actuator being formed of diamagnetic material, whereby the ferromagnetic compressing plate can cyclically be attracted by the field of said actuator toward the diamagnetic compressing plate to compress and collapse the entire portion of the shunt cyclically between the two compressing plates.

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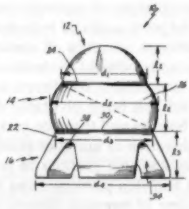
**4,302,855**

## PLUG FOR THE INTRAMEDALLARY CANAL OF A BONE AND METHOD

**Alfred B. Swanson, 2945 Bonnell, SE., Grand Rapids, Mich. 49506**

**Filed Apr. 27, 1979, Ser. No. 34,011**
**Int. Cl.³ A61F *1/00, 1/24***
**U.S. Cl. 3—1.9** **18 Claims**



**1**. An article for plugging an open ended intramedullary canal of a bone to restrict the flow of a cement used to fix a prosthesis inserted into the open end of the canal, said article comprising:

a resilient body of medical grade material, said body being generally frusto-conical in shape and having a lower end and an upper end, said body tapering inwardly from said upper end to said lower end, said upper end including a wall defining a recess opening through the upper end of the body, said body upper end being deformable within an intramedullary canal to seal the canal, prevent extrusion

of the article back out of the open canal and prevent flow of cement therebeyond.

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**4,302,856**

**ARTIFICIAL LIMBS**

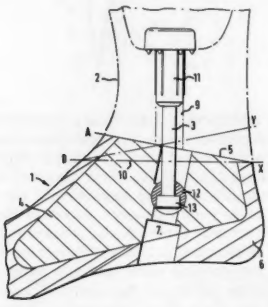
**Denis R. W. May, London, England, assignor to J. E. Hanger & Company Limited, London, England**

**Filed Jul. 10, 1979, Ser. No. 56,162**

**Claims priority, application United Kingdom, Aug. 3, 1978, 32146/78**

**Int. Cl.**[3] **A61F** *1/04, 1/08*

**U.S. Cl. 3—30** **4 Claims**



**1**. A solid ankle artificial leg comprising an elongated shin portion, an internally threaded female member within said shin portion, the axis of said threaded female member extending parallel to the direction of elongation of said shin portion, a foot portion having a solid ankle cushioned heel, a cylindrical trunnion mounted within said foot portion for rotation about an axis which is transverse to the direction of elongation of said shin portion, a hole extending between the sole and the uppermost surface of said foot portion in intersecting relation to said cylindrical trunnion, a threaded bolt passing via the portion of said hole below said cylindrical trunnion transversely through said cylindrical trunnion and extending via the portion of said hole above said cylindrical trunnion from the interior of said foot portion to a position beyond the uppermost surface of said foot portion, said threaded bolt engaging said threaded female member within said shin portion, the head of said bolt being accessible from the sole of said foot portion via the portion of said hole below said cylindrical trunnion to screw said bolt into said female member thereby to connect said foot and shin portions together, the portion of said hole above said trunnion exhibiting a cross section which is of slot-like configuration having a width substantially equal to the diameter of said bolt and a length that is elongated in the direction of elongation of said foot portion, said bolt being pivotable through said slot-like portion of said hole, as said trunnion rotates about its axis, in the fore and aft direction of said foot portion at the time of assembly of said foot and shin portions to permit the angular relation of said foot and shin portions to be varied relative to one another at the time of assembly thereby to determine the heel height of said leg at the time of assembly, the head of said bolt being countersunk into a side wall of said cylindrical trunnion to avoid interference between said bolt head and said foot portion when said bolt and cylindrical trunnion are moved within said foot portion at the time of assembly of said foot and shin portions, the said foot and shin portions and said bolt and trunnion being fixed in position relative to one another at said determined heel height by adjusting the relation of the confronting surfaces of the shin and foot portions and by tightening said bolt into said threaded female member with said bolt extending perpendicular to the ground when the user of the artificial leg is standing.

**4,302,857**

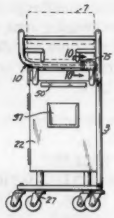
**BASSINET**

**Reuben P. Kodet; Wayne E. Kohlmeier, and Willard A. Schuster, all of Manitowoc, Wis., assignors to American Hospital Supply Corporation, Evanston, Ill.**

**Filed Jul. 11, 1979, Ser. No. 56,677**

**Int. Cl.**[3] **A47D** *13/00;* **A47B** *67/00*

**U.S. Cl. 5—2 R** **22 Claims**



**1**. A bassinet with a tub support having a wheeled base and a forwardly cantilevered top; a wheeled support cabinet adapted to nest with the tub support from a frontal direction; a frontal openable member on a front of the supply cabinet; and a coupling means to temporarily join the supply cabinet and support so that they move as a unit.

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**4,302,858**

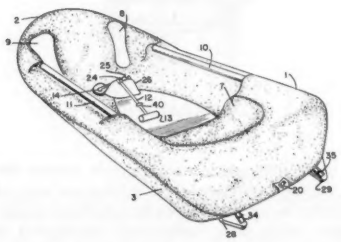
**STEERABLE TOWED VEHICLE**

**Frederick M. Casciano, 1651 Ala Moana Blvd., Honolulu, Hi. 96815**

**Filed Aug. 1, 1978, Ser. No. 930,093**

**Int. Cl.**[3] **A63C** *5/00;* **B63B** *21/56*

**U.S. Cl. 9—310 B** **16 Claims**



**1**. A towed water sled vehicle comprising,

a body,

a first rope attachment mounted on the body near a stern thereof,

a second rope attachment mounted on the body forward of the first attachment,

a first rope connected to the first attachment and a second rope connected to the second attachment,

joint means for joining the ropes remote from the attachments and means for towing the vehicle from the joint means, and

holding means connected to the vehicle for holding the first rope close to the vehicle thereby preventing tipping of the vehicle,

the holding means comprising a laterally arced groove formed in the body and positioned between the first and second rope attachments, a slide mounted in said arced groove and having a portion extending from the body with an opening of a diameter slightly larger than the first rope, the first rope passing through the opening

a first closure means permanently connected to one end of

the arced groove for preventing movement of the slide past the end of the arced groove, and

a second closure means removably connected to a remote end of the groove for preventing movement of the slide past the remote end of the groove.

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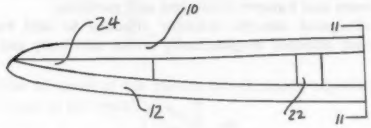
**4,302,859**

## SURFBOARD AND METHOD OF CONSTRUCTING SAME

**Andre A. Kozminski, 3642 Euclid Ave., San Diego, Calif. 92105**

**Filed Sep. 17, 1979, Ser. No. 75,883**
**Int. Cl.³ A63C *5/00***
**U.S. Cl. 9—310 E** **10 Claims**




1. A method of constructing a surfboard comprising the following steps in substantially the order named:

(a) providing two panels, of slightly less width and substantially the same length and plan configuration as the desired surfboard, to be used as the top and bottom skins;

(b) inserting a set of separate and discrete spacer blocks of light weight strong material between said top and bottom skins, said blocks being of critical and varied height dimensions and critically located so that the assembly duplicates the thickness dimensions of the desired surfboard, applying glue to the interfaces of the blocks and skins, and forming the assembly in a jig while the glue sets to achieve the desired longitudinal, generally concavo-convex edge profile of the surfboard;

(c) building rails onto the vertical side edges of said assembly in the form of vertical laminae pre-cut with the same generally concavo-convex profile and of light weight, strong, water-insoluble material, the laminae on each side being glued together and glued to said vertical side edges; and

(d) smoothing, finishing and coating the surfboard.

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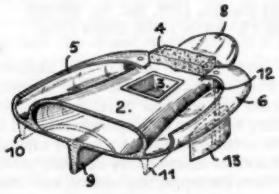
**4,302,860**

## FLOATING DEVICE FOR SWIMMING ACTIVITIES

**Claude S. Puch, Noisy-le-Sec, France, assignor to Societe Meritor, Vanves, France**

**Filed Nov. 30, 1979, Ser. No. 98,964**
**Claims priority, application France, Dec. 7, 1978, 78 134454**
**Int. Cl.³ A63C *9/08***
**U.S. Cl. 9—310 R** **6 Claims**




1. A flexible floatatable device for transporting a swimmer through a dangerous water course, said device comprising:

(a) a relatively rigid hull comprising a lower surface that rides on top of the water, an upper surface adapted to receive a swimmer in a chest down position with the feet of the swimmer projecting beyond the rear edge of said hull, and a chamber defined between said upper and lower surfaces of said hull,

(b) a relatively supple deformable member detachably secured within said chamber to provide a cushioning function for the hull and for the swimmer,

(c) said deformable member comprising an inflatable tube that projects forwardly beyond the hull for providing a bumper at the forward end of the hull,

(d) hand grips situated on said hull so that the swimmer can securely grasp same, and

(e) means for protecting the arms and hands of a swimmer from obstacles situated in the water course while the swimmer grasps said hand grips.

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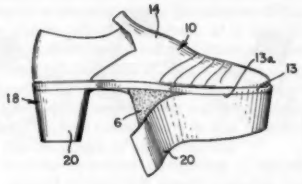
**4,302,861**

## METHOD OF MAKING A SHOE BUILDUP

**Earl E. Coppock, 415 W. 1st St., Marion, Ind. 46952**

**Filed Apr. 1, 1980, Ser. No. 136,371**
**Int. Cl.³ A43D *9/00*; A43B *3/12, 13/12***
**U.S. Cl. 12—142 S** **7 Claims**




1. A method for the manufacture of a shoe comprising:

providing a shoe having an upper and a first sole member secured to the lower portion of the upper, said sole member having a lower surface, providing a block of rigid, lightweight foam material, shaping the block of foam material to conform generally to the shape of at least a portion of the lower surface of the sole member, attaching the shaped block of foam material to the lower surface of the sole member, said shaped block having a lower surface, and nailing one of a ground engaging second sole member and ground engaging heel member to the lower surface of said shaped block.

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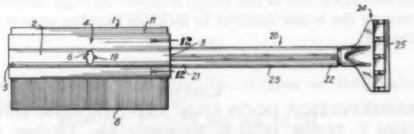
**4,302,862**

## SNOW REMOVAL TOOL

**Robert W. Machacek, Lombard; Charles E. Nichols, Woodridge, and John R. Howard, West Chicago, all of Ill., assignors to The Drackett Company, Cincinnati, Ohio**

**Filed Dec. 26, 1979, Ser. No. 106,647**
**Int. Cl.³ B60S *3/04***
**U.S. Cl. 15—117** **10 Claims**



1. A snow removal tool having multiple modes of assembly, comprising:

a. a brush having a first end and a second end with a center portion therebetween;

b. a handle having a first end and a second end interconnected by a center portion, an engaging means at the first end of the handle for selectively, (i) transversely engaging the center portion of the brush, resulting in the tool being assembled in a T-shaped mode or, (ii) coaxially engaging

the first end of the brush, resulting in the tool being assembled in a longitudinal mode;

wherein said engaging means is comprised of a male locking member transversely connected to the first end of the handle; and

wherein the center portion of the brush has a female opening corresponding to the male locking member whereby insertion of the male locking member into the female opening and rotation of the handle with respect to the brush results in the snow removal tool being locked in the T-shaped mode.

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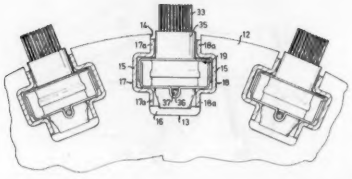
**4,302,863**

## BRUSH FOR ROTATING BRUSH ROLLERS IN SWEEPING MACHINES

**Walter Droeser, Ragnaröksgatan 7, S-72355 Västeras, Sweden**

**Filed Jun. 25, 1980, Ser. No. 162,683**
**Claims priority, application Sweden, Jun. 27, 1979, 7905644**
**Int. Cl.³ A46B** *7/10, 3/16*
**U.S. Cl. 15—183** **4 Claims**



**1**. A brush for a rotating brush roller in sweeping machines, especially for airfields and streets, comprising a plurality of bristle bunches attached mutually spaced along a brush bridge intended for mounting in axial guides arranged at the periphery of discs attached to the rotor of the brush roller, said bristle bunches comprising bristle wires bent double round a locking wire or similar means coacting with stops on the brush bridge for retaining the bristle bunches on the bridge, characterized in that the brush bridge is made up from two sheet metal sections each having a substantially U-shaped section with parallel flanges and an intermediate web, that the sections are facing towards each other and are put together so that the flanges of one section lie inside the flanges of the other section and bear against the webs thereof, that openings at uniformly distributed places along the bridge are made in the webs of the two sections, said openings being stamped inwards to form softly rounded edges and merging into cylindrical studs, that the ends of the mutually opposing studs overlap each other, that the two sections are joined together by means of welding, that the bristle bunches are each inserted with their doubled ends in the respective opening in the upper side of the bridge to project out on the under side of the bridge, and that the locking wire on the under side of the bridge is drawn through the doubled ends of the bristle bunches to lock the bunches against withdrawal.

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**4,302,864**

## COMBINATION DOOR STOP AND LATCHING DEVICE

**Mike Y. Morita, 15722 S. Normandie Ave., Gardena, Calif. 90247**

**Filed Nov. 16, 1979, Ser. No. 94,701**
**Int. Cl.³ E05F** *5/06*
**U.S. Cl. 16—85** **2 Claims**

**1**. In combination, a door stop and latching device to releasably latch a door in an open position, wherein the device comprises:

a main body adapted to be mounted to a fixed structure and having first and second compartments;

an elongated sleeve member having an opened end bore disposed at the forward end of said body, defining said first compartment;

a partition disposed intermediate said first and second compartment, and including a central opening therein;

a latching lever having a latch tongue formed on the free end thereof, said latching tongue having an outer convex, arcuate, engaging surface and an inner concave locking surface, said lever being rotatably mounted to said body;

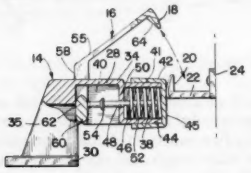
a shaft mounted to said latching lever whereby said latching lever rotates therewith, said shaft being transversely positioned in said second compartment;

a cam-abutment member affixed to said shaft;

a bumper cover adapted to be slidably mounted on said sleeve member and arranged to cover said bore opening;

a biasing spring disposed in said bore and interposed between said bumper cover and said partition;

an elongated cam-pin actuator attached to said bumper cover disposed longitudinally within said body and positioned to engage said cam-abutment member to cause said latching lever to rotate with respect to said body;



stop means mounted to said cam-pin actuator to limit the forward movement of said bumper cover;

means for securing said body in a fixed position to a stationary structure; and

keeper means affixed to said door for engagement with said latching lever and said bumper cover; wherein said keeper means comprises a mounting-plate member, an arm member extending outwardly from said mounting plate, and an enlarged, rounded, cylindrical head member formed on said arm member at right angles thereto and adapted to lockingly engage said inner concave locking surface of said latching tongue, regardless of the angle of incidence therebetween, when said door is positioned in a locked open mode; and

means for securing said body in a fixed position to a stationary structure.

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**4,302,865**

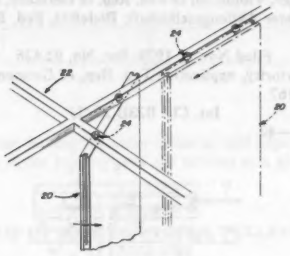
## MULTI-DIRECTIONAL CANTED WHEEL CARRIER WITH SHIFTABLE CONTROL ARM FOR OPERABLE WALLS

**Guy E. Dixon, and William M. Mack, Jr., both of Miami, Fla., assignors to Panelfold, Inc., Miami, Fla.**

**Filed Dec. 31, 1979, Ser. No. 108,468**
**Int. Cl.³ A47N** *15/00;* **E05D** *13/02*
**U.S. Cl. 16—97** **12 Claims**

**1**. A canted wheel carrier for movably supporting wall panels from a track, said carrier including a canted wheel having a rotational axis inclined in relation to vertical and horizontal whereby a portion of the peripheral axial surface of the canted wheel is rollingly engaged with a supporting surface of the track and the diametrically opposite portion of the wheel is spaced from the supporting surface, said track having spaced track flanges defining a longitudinally extending track slot, and wherein said carrier includes a tilt body having said wheel rotatably mounted thereon for rotation about the inclined axis, support means rotatably connecting said tilt body with said panel, and a longitudinally extending control arm connected to said tilt body such that the control arm and tilt body are non-rotatable in relation to each other, the control arm including a shiftable member operative in a longitudinally

extending guideway in the track for maintaining said tilt body and said inclined rotational axis in correct orientation to the



direction of travel of the carrier and facilitate negotiation of angle turns in the track.

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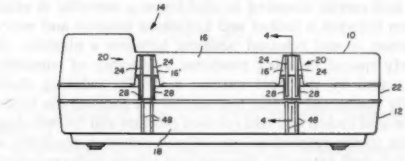
**4,302,866**

## RELEASABLE HINGE FOR SWINGABLE PORTIONS OF A CONTAINER

**Ronald D. Irvin, Poway, Calif., assignor to The Quaker Oats Company, Chicago, Ill.**

**Filed Jan. 18, 1980, Ser. No. 113,204**
**Int. Cl.³ E05D** *1/06, 7/10*
**U.S. Cl. 16—171** **4 Claims**



1. A releasable hinge for cover and bottom portions of a container or the like having cover and bottom rear walls lying substantially in one plane when the container is closed, said cover and bottom rear walls further having edge surfaces facing one another in said closed position, said hinge comprising:

a pair of spaced apart laterally flexible spring fingers, each lying substantially in a plane transverse to said one plane and having a free end projecting from one of said cover and bottom rear walls toward the other of said cover and bottom rear walls, each free end of said fingers further extends beyond its complementary edge surface and has a flat front surface in alignment with the front side of said cover rear wall, and a back surface extending rearwardly of the back side of said cover rear wall and merging with said front surface at the free end of said finger, each of said fingers further having a laterally extending rounded projection on the outer side of said free end thereof; and

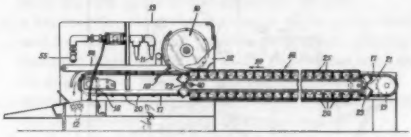
a blind notch on said other of said cover and bottom rear walls for receiving said fingers, said notch having side surfaces arranged and spaced to laterally flex said spring fingers together as they are introduced into said notch, said side surfaces further having opposed recesses at the blind end of said notch for receiving said projections whereby said rear walls of said container are hinged together until said container is opened beyond a maximum open position causing said back surfaces of said fingers to engage and pivot about said blind end of said notch forcing said projections out of said recesses for unhinging said rear walls.

**4,302,867**

## DUAL FEED CONVEYOR IN GIZZARD PROCESSING MACHINE

**Carl J. Hill, Rte. 3, Box 229, Ball Ground, Ga. 30107**

**Filed Mar. 10, 1980, Ser. No. 128,807**
**Int. Cl.³ A22C** *21/00*
**U.S. Cl. 17—11** **7 Claims**



1. In a machine for processing poultry gizzards with the stomachs attached which comprises endless conveyor means having a run thereof trained for movement along a given path in a given direction, and adapted to support and transport the gizzard, cutting means positioned at a first location for cutting the gizzard open to thereby expose the interior of the gizzard, and washing means adjacent the path at a second location along the path for flushing the exposed interior of the gizzard, the improvement wherein said conveyor means comprises:

a first endless conveyor comprising a pair of first wheels and first endless belt means engaging said wheels and having a run thereof located substantially in said path and extending for the full length of said path; and

a second endless conveyor comprising a second pair of wheels, second endless belt means engaging said second wheels and a plurality of gizzard support means secured to said belt, said second endless belt means having a run thereof located substantially in a portion of said path and below said run of the first belt means, one of the second wheels defining the upstream end of said run of the second belt means and the other of the second wheels defining the downstream end thereof, said second wheels being located intermediate the first wheels with said downstream end being sufficiently close to said first location such that a gizzard on said conveyor means will at least commence to be cut before reaching said downstream end, said support means comprising upright portions at each side of the second belt means and having proximal parts and distal parts, the proximal parts being affixed to the second belt means, at said run of the second belt means said upright portions being at each side respectively of the first belt means and spaced apart a distance sufficiently great to permit a stomach to be received therebetween to ride on the first belt means and with said distal parts at a greater elevation than said first belt means, said support means including supporting surfaces at said distal parts and, at said run of the second belt means, sufficiently close together to hold a gizzard riding thereon above the first belt means.

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**4,302,868**

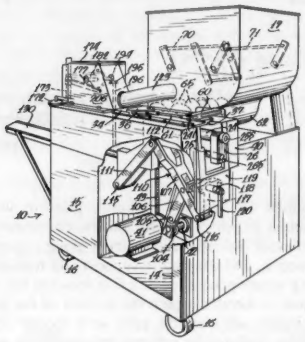
## MOLDING APPARATUS

**Richard C. Wagner, Frankfort, Ill., assignor to Hollymatic Corporation, Park Forest, Ill.**

**Filed Oct. 22, 1979, Ser. No. 86,761**
**Int. Cl.³ A22C** *7/00*
**U.S. Cl. 17—32** **23 Claims**

1. Molding apparatus for molding patties of ground raw meat, comprising: a hopper for holding a supply of said meat; a mold having a patty shaped mold cavity; exit opening means from said hopper; a pressure chamber for receiving said meat from said hopper through said exit opening; transfer means in said hopper for moving said ground raw meat toward said exit opening from the hopper and into said pressure chamber; means defining a fill opening extending between said pressure chamber and a said mold cavity for filling said cavity with

pressurized meat; a pressure ram in said pressure chamber for forcing said meat through said fill opening and into said mold cavity; means for moving said mold between a filling position for said cavity and an ejecting position for removal of said patty from said cavity; a power source; and a lever system



hingedly connected to said power source and to said mold, to said transfer means and said pressure ram for moving said mold, transfer means and pressure ram, said lever system being characterized by direct hinge means connections to said power source, mold, transfer means and pressure ram thereby avoiding lost motion connections to reduce noise pollution.

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**4,302,869**

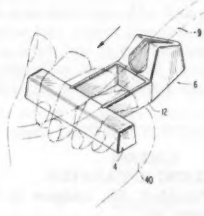
## HAND PULLER FOR ROPES

**John Hackney, 1026 NW. 16th St., Stuart, Fla. 33494**

**Filed May 15, 1980, Ser. No. 150,084**

**Int. Cl.³ F16G *11/04***

**U.S. Cl. 24—115 R** **1 Claim**



1. A rope pulling device comprising a handle portion and a rope cleating portion attached to said handle portion, said rope cleating portion comprising a triangular base section, a pair of right-angled triangular sides integral with said base section along the hypotenuse thereof, a triangular web extending between the upper pair of legs of said triangular sides, a trapezoidal web extending between the other pair of legs of said triangular sides, a triangular slot in said triangular web the apex of which is distal to said handle portion and an opening in said trapezoidal web that joins to said triangular slot at the base thereof.

**4,302,870**

## INDEXABLE REVOLVING TURRET

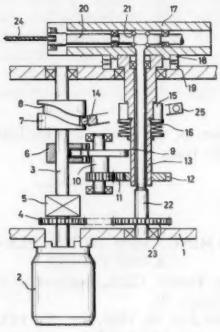
**Erhard Schalles; Reinhard Stender, both of Bielefeld, and Herbert Seeger, Vlotho, all of Fed. Rep. of Germany, assignors to Gildemeister Aktiengesellschaft, Bielefeld, Fed. Rep. of Germany**

**Filed Nov. 7, 1979, Ser. No. 92,426**

**Claims priority, application Fed. Rep. of Germany, Nov. 13, 1978, 2849167**

**Int. Cl.³ B23B *29/32***

**U.S. Cl. 29—40** **8 Claims**



1. An indexable revolving turret, comprising a housing; a rotary tool carrier mounted on said housing movable in axial direction between a locked and a released position and movable, when in said released position, between a plurality of angularly spaced indexing positions; a plurality of rotatable tools carried by said tool carrier; a tubular indexing shaft coaxially connected to said tool carrier for moving the latter between said locked and said released position and for indexing the same to the respective ones of said indexing positions; a tool drive shaft extending through said tubular indexing shaft coaxially therewith and operatively connected to said tools for rotating the same upon rotation of said tool drive shaft; a drive motor; a control shaft parallel to said indexing shaft; transmission means between said control shaft and said indexing shaft, said transmission means comprising a Maltese-cross drive; means for moving said tool carrier between said locked and said released position including a member mounted on said control shaft for rotation therewith and having a cam groove and cam follower means connected to said indexing shaft and engaging in said cam groove; further transmission means between said drive member and said tool drive shaft; and only one coupling means movable between a first position connecting said control shaft with said drive motor and a second position coupling said drive motor to said further transmission means.

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**4,302,871**

## PRESS OR REVERSING ROLLER FOR DOUBLE SIEVE BAND DRAINAGE MACHINES

**Rupert Syrowatka, Graz, Austria, assignor to Maschinenfabrik Andritz Aktiengesellschaft, Austria**

**Filed Oct. 12, 1979, Ser. No. 84,514**

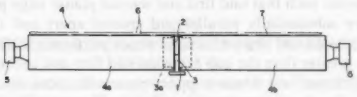
**Claims priority, application Austria, Oct. 27, 1978, 7676/78**

**Int. Cl.³ B21B *13/00***

**U.S. Cl. 29—110** **1 Claim**

1. In a press or reversing roller for double sieve band dehydrating machines for dehydrating suspensions, particularly a press roller in which the sieves with an interposed sheet of material partially loop over the roller, the roller being provided in a multiple-piece manner over the sieve path, and wherein one step bearing is provided at the junction point of two adjacent rollers,

the improvement comprising stationary covering means secured between end faces of adjacent rollers, said cover-



ing means having the same radius as said adjacent rollers at least in the looping area and serving as a glide shoe.

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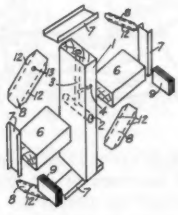
**4,302,872**

## METHOD OF MAKING WHEELS, PULLEYS AND TUMBLERS

**Henry J. F. Gerrand, 25 Haldane St., Beaumaris, Victoria, Australia (3193)**

**Filed Jul. 13, 1979, Ser. No. 57,416**
**Claims priority, application Australia, Jul. 24, 1978, PD5196**
**Int. Cl.[3] B21D** *53/26;* **B60B** *1/04, 1/14, 25/00*
**U.S. Cl. 29—159.03** **15 Claims**



1. A method of forming a wheel or pulley comprising the steps of:

a. providing a tyre casing having high tensile strength wires embedded in the beads thereof,

b. inserting a plurality of spoke means which engage said beads and extend radially inwardly of the casing, the length of said spoke means being such as to stretch and deform the wires in said beads to a generally polygonal form, and

c. supporting the radially inner ends of said spoke means in such a manner that said spoke means are held in position by the tension in the wires caused by stretching the beads.

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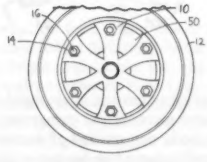
**4,302,873**

## WHEEL DISLODGING TOOL

**Morris Rotman, 20 S. Newark Ave., Ventnor, N.J. 08406**

**Filed May 21, 1980, Ser. No. 152,106**
**Int. Cl.[3] B23P** *19/04*
**U.S. Cl. 29—259** **3 Claims**



1. A dislodging and dismounting tool for dislodging and dismounting a mounted wheel from a drum of a vehicle, said tool comprising:

a. a cylindrically shaped base member whose first end is internally threaded to be threadably engageable and rotatable on a drum stud projecting through a stud hole of a wheel mounted on said drum and whose second end has attachment means for securing a wheel dismounting member, with said base member having an outside diameter less than the inside diameter of the stud hole of the wheel;

b. a collar member having at least one ear element extending laterally therefrom, said collar member being slideable onto the base member and retainable thereon;

c. a bar member for each ear element of the collar member, said bar member being passable through an opening in a mounted wheel and having at one end thereof hook means to engage the outer lip of the inside surface of said mounted wheel, with said bar member being mountable on the ear element via mounting means; and

d. a wheel dismounting member comprising a rod having at least two horizontal portions at 0° from a horizontal plane and having one angular portion disposed between each two horizontal portions, said angular portion being disposed at an angle greater than 0° and less than about 50° from each adjacent horizontal portion, said rod having a first end and a second end, said first end having attachment means which are complimentary to the attachment means of the base member for attaching said dismounting member to said base member.

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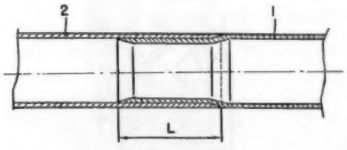
**4,302,874**

## METHOD OF FORMING PIPE UNION

**Francois Colas, Bourg-la-Reine, France, assignor to Cegedur Societe de Transformation de l'Aluminium Pechiney, Paris, France**

**Filed Nov. 28, 1979, Ser. No. 98,129**
**Claims priority, application France, Dec. 13, 1978, 78 35615**
**Int. Cl.[3] B23P** *19/00*
**U.S. Cl. 29—426.6** **5 Claims**



1. A method of joining two standard pipes originally having identical dimensions and walls which are comparatively thin relative to their diameter, wherein the pipes have previously been subjected to the steps of forcefully socket jointing the end of one of the pipes within the end of the other over a length which is at least equal to its diameter, while gripping the end of the other pipe in an undeformable die over the socket jointing length, separating by traction the jointed ends whereby the two ends interfit one within the other except for differences in diameter due to elastic retraction upon separation, subsequently rejoining the two ends over the initial socket jointing length by insertion of one end into the other and applying a socket jointing force of short duration to overcome the difference in the diameter of the two ends due to the elastic retraction.

## 4,302,875
## COMPLEMENTARY MOSFET DEVICE AND METHOD OF MANUFACTURING THE SAME

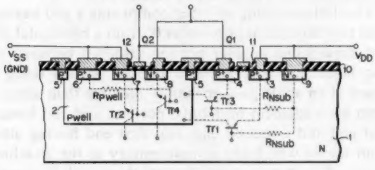
**Kazuo Satou, Yokohama, and Mitsuhiko Ueno, Fujisawa, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan**

**Division of Ser. No. 890,029, Mar. 24, 1978, Pat. No. 4,167,747, which is a continuation of Ser. No. 706,001, Jul. 16, 1976, abandoned. This application May 23, 1979, Ser. No. 41,764**

**Claims priority, application Japan, Jul. 18, 1975, 50-87395; Jul. 18, 1975, 50-88064; Jul. 18, 1975, 50-88065; Jul. 18, 1975, 50-88066**

**Int. Cl.³ H01L *21/40***

**U.S. Cl. 29—571** **3 Claims**




**1.** A method of manufacturing a semiconductor device comprising the steps of forming a semiconductor substrate of one conductivity type; forming a well layer of the opposite conductivity type in said semiconductor substrate; forming a first MOS transistor of one channel type comprising first drain and source regions in said substrate outside said well layer; forming a second MOS transistor of opposite channel type comprising second drain and source regions in said well layer, said substrate and said well layer respectively constituting, in the presence of impulse noise, the base region of first and second lateral parasitic bipolar transistors and the base region of first and second vertical parasitic bipolar transistors; and gold doping and semiconductor substrate sufficiently to assure that the product of the current amplification factors $B_1$ of at least one of said lateral parasitic bipolar transistors and $B_2$ of at least one of said vertical parasitic bipolar transistors is smaller than 1.

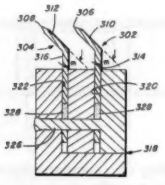
## 4,302,876
## RAZOR BLADE WITH INCLINED EDGE

**James S. Emmett, Ansonia, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Mar. 14, 1980, Ser. No. 130,484**

**Int. Cl.³ B26B *21/02, 21/22***

**U.S. Cl. 30—47** **3 Claims**



**1.** A razor assembly comprising

razor blade support means,

a first razor blade supported by said blade support means, comprising:

a first planar edge portion having a longitudinal cutting edge, and

a first major planar portion continuous with said first planar edge portion; and

a second blade supported by said blade support means comprising:

a second planar edge portion having a longitudinal cutting edge, and

a second major planar portion continuous with and being disposed at a substantial angle to said second planar edge portion;

said first and second blades being arranged in said support means such that said first and second planar edge portions are substantially parallel and spaced apart and the gap between said first and second major portions of said blades is greater than the gap between said first and second edge portions, said blade support means includes means for resiliently supporting said first and second blades for independent movement in a direction within the plane of said first and second major planar portions, respectively.

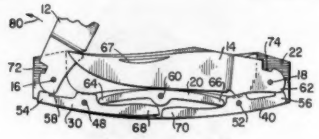
## 4,302,877
## SINGLE SPRING DOUBLE LOCKBLADE FOLDING KNIFE

**Thomas D. Hart, and David J. Hart, both of Bradford, Pa., assignors to W. R. Case & Sons Cutlery Company, Bradford, Pa.**

**Filed May 12, 1980, Ser. No. 149,278**

**Int. Cl.³ B26B *1/00***

**U.S. Cl. 30—161** **9 Claims**



**1.** In a foldable knife having a handle and two blades pivoted to the handle for movement to and from open and closed positions, the improvement comprising:

(a) a locking member for each of said blades mounted in tandem to said handle for movement to and from locked and unlocked positions; each of said members mounted on separate spaced-apart pivot means and

(b) a single spring mounted in said handle for urging both of said locking members toward their locked position.

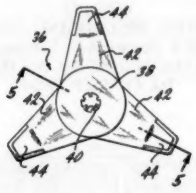
## 4,302,878
## CUTTING BLADE

**Anthony G. Bonforte, P.O. Box 1844, Rancho Santa Fe, Calif. 92069**

**Filed Oct. 22, 1979, Ser. No. 86,715**

**Int. Cl.³ A01D *55/00***

**U.S. Cl. 30—347** **5 Claims**



**1.** A unitary one-piece cutting blade molded from a durable high strength plastic material and comprising:

a unitary blade body constructed of durable nylon having a central generally planar hub having an axis of rotation and outer radius, and a co-axially disposed shaft receiving bore for mounting on a rotatable shaft; and

a plurality of cutting arms extending outward from said hub and each arm having a pair of opposed generally straight edges extending tangentally from the outer radius of the hub to the outer end thereof at an angle of from about 12

to 17 degrees from a radial line through the axis tapering downward toward the tip, at least one of said edges being a cutting edge.

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**4,302,879**

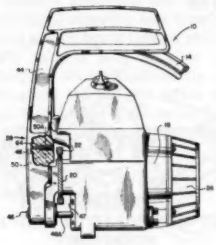
## SAFETY BRAKING APPARATUS FOR PORTABLE CHAIN SAW

**Billy W. Murray, Shreveport, La., assignor to Beaird-Poulan Division Emerson Electric Co., Shreveport, La.**

**Division of Ser. No. 942,987, Sep. 18, 1978, Pat. No. 4,197,640. This application Dec. 10, 1979, Ser. No. 102,014**

**Int. Cl.³ B27B** *17/00*

**U.S. Cl. 30—382** **2 Claims**



1. In a chain saw of the type including a housing, a guide bar projecting from said housing, a cutting chain mounted to run on said guide bar in a closed loop, and motive means carried by said housing coupled to said cutting chain for propelling said cutting chain around said guide bar, the combination with said housing of a safety lever and pivot pin projecting intermediate said safety lever and said housing and supporting said safety lever for pivotal movement relative to said housing, said housing having a channel adjacent said pivot pin through which said cutting chain travels as it is propelled around said guide bar, said pivot pin including a shank portion projecting into said channel and defining a chain guard member disposed between opposite ends of said loop and beneath the lower run of said loop of said cutting chain and projecting transversely with respect to the plane of said loop through the probable trajectory followed by said cutting chain when said chain becomes disengaged from said guide bar during operation whereby said chain guard member serves to catch or intercept said cutting chain and retard its movement or at least foreshorten said cutting chain to prevent it from striking an operator of said chain saw.

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**4,302,880**

## ENGINE REGULATOR FOR A POWER SAW

**Göran L. Elfving, Lindome, and George N. Farquhar, Alingsas, both of Sweden, assignors to Aktiebolaget Partner, Molndal, Sweden**

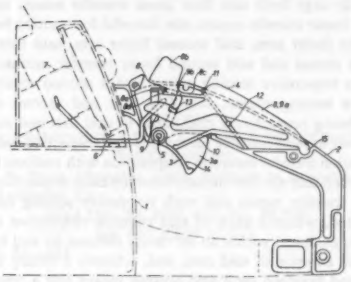
**Filed May 21, 1980, Ser. No. 152,134**

**Claims priority, application Sweden, May 29, 1979, 7904657**

**Int. Cl.³ B27B** *17/00*

**U.S. Cl. 30—382** **6 Claims**

1. In an engine regulator for a power saw or the like wherein said engine is provided with a throttle valve, a handle piece for said saw having a finger grip on one side thereof, said finger grip being mechanically connected to said throttle valve of the engine, spring biased means for said finger grip for maintaining said throttle valve in an idle position, said handle being provided with a middle hand grip arranged to maintain said finger grip in its idle position when not actuated, and to release said finger grip when actuated into a depressed position, a thumb grip arranged in front of said middle hand grip to maintain said finger grip in a middle position when said thumb grip is actuated, the improvement comprising: a first hooking member on one part of said middle hand grip and thumb grip, a second hooking member on another part of said hand grip and spaced from said first hooking member, said first and second hooking members being in a common element of said middle hand grip, said middle hand grip including a press knob on said thumb grip, one of said hooking members having a forwardly directed dog and the other of said hooking members being positioned



inside said first hooking member and constituting a backwardly directed dog, and a projection on said finger grip member moving in the open space between said first and second hooking members in which said dogs are selectively enterable by said projection upon pressing said thumb grip down or permitting the middle hand grip to move upwardly.

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**4,302,881**

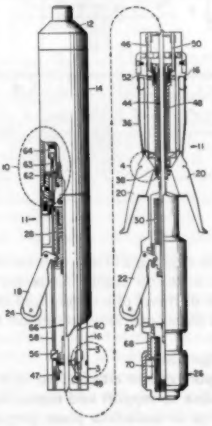
## CALIBRATED CONDUIT CALIPER AND METHOD

**Edward C. Schwind, Burleson, and Bobby J. Hallmark, Fort Worth, both of Tex., assignors to Gearhart Industries, Inc., Forth Worth, Tex.**

**Filed Mar. 31, 1980, Ser. No. 135,723**

**Int. Cl.³ G01B** *7/12, 7/28*

**U.S. Cl. 33—178 F** **9 Claims**



1. In an internal diameter caliper having a tool body provided to be coaxially aligned within a generally cylindrical conduit, a plurality of feeler arms with each said feeler arm mounted through bearing means with said body and provided to be urged by respective first resilient biasing means to radially extended positions relative to the axis of said tool, a first linear motion transfer means adapted for forceful contact with that first feeler arm having the greatest radial extension of any said feeler arm and adapted for linear movement corresponding to the extension of said first feeler arm, and a second linear

motion transfer means adapted for forceful contact with that second feeler arm having the least radial extension of any said feeler arm and adapted for linear movement corresponding to the extension of said second feeler arm, the combination including: a second resilient biasing means operative between said first linear transfer means and said second linear transfer means to urge both said first linear transfer means and said second linear transfer means into forceful lost motion between said first feeler arm, said second feeler arm, said first linear transfer means and said second linear transfer means; a first rotation responsive sensing means and a second rotation responsive sensing means, said first and said second sensing means being respectively connected to said first and said second linear motion transfer means through respective linear/rotary motion transfer means in cooperation with resilient biasing means such that any lost motion between each respective linear motion transfer means and each respective sensing means is eliminated, wherein each of said rotation responsive sensing means is enclosed within an air cavity defined by and isolated from the exterior of said tool, and, wherein a rotary shaft is connected between each said sensing means and a respective said linear/rotary motion transfer means through a fluid tight sealing means and a double race end thrust support bearing means.

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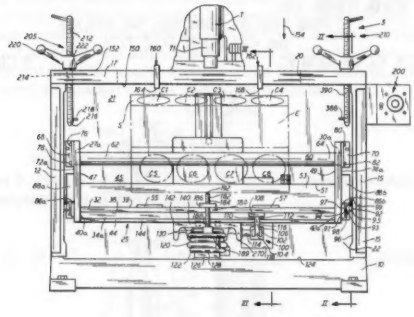
**4,302,882**

## ENGINE BORING FIXTURE

**Robert W. Bradley, and Vyron E. Anderson, both of Cedar Rapids, Iowa, assignors to Kwik-Way Manufacturing Company, Marion, Iowa**

**Filed May 8, 1979, Ser. No. 37,003**
**Int. Cl.[3] G01B *5/14***
**U.S. Cl. 33—180 B** **21 Claims**



1. Apparatus for aligning a center of rotation of a crankshaft of an internal combustion engine block perpendicular to a selected direction of travel of a boring tool comprising:

engine support means operative to support the engine block to be bored;

a means for alignment;

alignment support means attached to said engine support means operative to support said means for alignment and orient it so as to include a plane perpendicular to the selected direction of travel of the boring tool;

said engine support means operative to raise and lower said engine and to position a selected surface of the engine block in contact with said means for alignment;

means for sensing located on said alignment support means, said means for sensing being adapted to sense a difference in spacing between, a first selected region of said engine support means and a first selected region of said alignment support means, and a second selected region of said engine support means and a second selected region of said alignment support means when the selected surface of the engine block to be bored is supported adjacent said means for alignment;

whereby said sensed difference might be minimized or eliminated so that the center of rotation of the crankshaft of the engine block would be perpendicular to the direction of travel of the boring tool.

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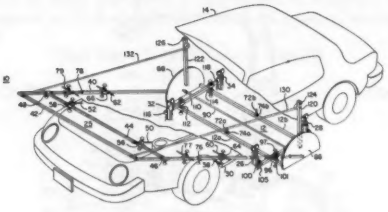
**4,302,883**

## VEHICLE FRAME, BODY AND WHEEL ALIGNMENT GAUGE

**Paul E. MacGregor, Guilford, Conn., assignor to Exacto-Mac Limited Partnership, Madison, Conn.**

**Filed Dec. 13, 1979, Ser. No. 103,164**
**Int. Cl.[3] G01B *5/255***
**U.S. Cl. 33—180 AT** **24 Claims**



1. An alignment gauge for a vehicle comprising:

a controlling member having a length greater than a width of the center portion of the vehicle;

means for securing the controlling member to an underside of the vehicle so that ends of the controlling member extend beyond sides of the vehicle;

a rotatable measuring member having a pair of parallel side arms and a transverse arm coupled to and extending between one end of each side arm and having a length at least equal to the width of the vehicle, and

means for rotatively coupling the controlling member to the side arms of the rotatable measuring member so that the rotatable measuring member may define a rotatable datum plane intersecting a center region of the vehicle, the datum plane forming a reference from which distance measurements of portions of the vehicle to the plane may be made thereby to obtain information as to the damage done to the vehicle.

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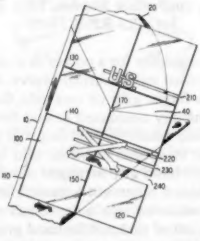
**4,302,884**

## INSIGNIA POSITIONING TEMPLATE

**Joseph G. Pallone, 6515 LeMans La., Columbus, Ga. 31904**

**Filed Feb. 1, 1980, Ser. No. 117,519**
**Int. Cl.[3] A41H *3/01***
**U.S. Cl. 33—180 R** **4 Claims**



1. A template (**100**) for positioning insignia on a uniform, said template including a vertical center line (**150**) marked

thereon, a first horizontal line (**130**) marked thereon, and at least one opening therein and characterized in that said template further comprising

a stud (**170**) protruding above and below said template and disposed to be in the plane of said center line;

said template being adapted to be lain on said uniform and being adapted to rotate and pivot about said stud;

said first horizontal line being a positioning line and being disposed to be a first predetermined positioning distance above said stud and being substantially perpendicular to said center line; and

a first opening being a longitudinal, horizontal slot (**210**), said slot being disposed to be a first predetermined slot distance above said stud and being adapted for receiving at least one spike of an insignia to be positioned and being adapted for slidably removing said template when said insignia is positioned whereby said template in being lain on said uniform and by being rotated until said center line is substantially parallel to a neckline of said uniform achieves a template situated sufficiently close to the uniform lapel to allow the insignia spikes to penetrate the lapel and pass through the uniform cloth so that retainer devices may be slidably inserted on the spikes for securing the insignia to the uniform.

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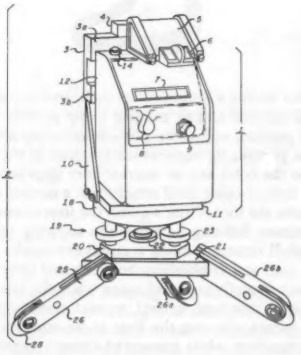
**4,302,885**

## NORTH FINDER WITH OPTICAL TRANSFER PROVISION

**Seymour Levine, Wood Land Hills, Calif., and Willis G. Wing, Glen Head, N.Y., assignors to Sperry Corporation, New York, N.Y.**

**Filed May 12, 1980, Ser. No. 149,087**
**Int. Cl.³ G01C *19/38***
**U.S. Cl. 33—228** **7 Claims**



1. Gyroscopic surveying means including:

north seeker gyrocompass means,

support means including means for levelling said north seeker gyrocompass means and means for selectively adjusting said north seeker gyrocompass means in azimuth,

sighting means disposed in fixed angular relation upon said north seeker gyrocompass means adapted for viewing the objective lens of a vicinal theodolite telescope having adjustability at least in azimuth, said sighting means including,

first and second coplanar mirror means, and

opaque divider means disposed at right angles between said first and second coplanar mirror means,

said coplanar mirror means being fixedly disposed at an acute angle with respect to the normally horizontal plane, and

retro-reflector means disposed in said same fixed angular relation upon said north seeker gyrocompass means viewable by said theodolite telescope permitting the azimuth axis of said theodolite telescope to be made substantially coincident with the active axis of said retro-reflector means.

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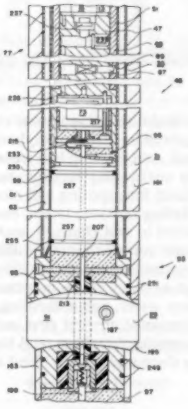
**4,302,886**

## GYROSCOPIC DIRECTIONAL SURVEYING INSTRUMENT

**George N. Starr, Memphis, Tenn., assignor to Robert L. Fournet, Lafayette, La.**

**Filed Oct. 29, 1979, Ser. No. 88,959**
**Int. Cl.³ E21B *47/022***
**U.S. Cl. 33—312** **6 Claims**



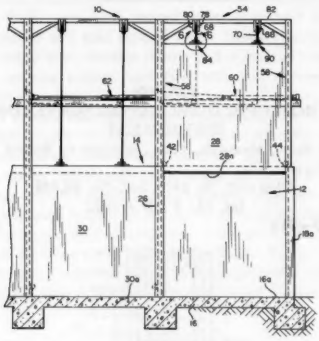
1. An improved well surveying apparatus comprising, in combination, a gyroscopic directional instrument system, and isolation means for maintaining, at least for a reasonable period of time, a suitable internal environment in which said gyroscopic directional instrument system may reliably function while being exposed exteriorly to an extremely hostile environment known to exist at the lower reaches of deep wells which extend several miles into the surface of the earth, said gyroscopic directional instrument system including electric motor means for driving a gimbal arrangement and a first power supply for providing a principal source of electromotive force (EMF) for powering said electric motor means; said isolation means including heat sink means for absorbing, within limits, the heat being generated by said electric motor means as power from said first power supply is being dissipated in the process of maintaining optimum revolutions-per-minute (RPM) of said gimbal arrangement, said heat sink means including a first mass of metal disposed adjacent said electric motor means and a second mass of metal shaped so as to be disposed adjacent said first mass of metal and said electric motor means for readily conducting heat from one to the other; said second mass of metal (constituting in part said heat sink means) being tubular shaped, said first and second masses of metal being compatible in size and shape to enable a portion of said tubular shaped heat sink means to be slip fitted over said first mass of metal; said heat sink means including quick disconnect fastener means for: (1) rigidly joining said first and second masses of metal together, and (2) facilitating expediency in separating said first and second masses of metal one from the other.

**4,302,887**

## VENEER BLOCK MOISTURIZING APPARATUS

**Jerry Johnson, Drain, Oreg., assignor to Jerry Johnson Mill Construction, Inc., Eugene, Oreg.**

**Filed Mar. 11, 1980, Ser. No. 129,478**
**Int. Cl.³ F26B *9/06***
**U.S. Cl. 34—13.8** **4 Claims**



**1**. Veneer block moisturizing apparatus comprising

means defining a vault having an upright opening for receiving such a block, said opening being bounded on opposite lateral sides by confronting moisture-sealing channels,

a rigid closure panel for exposing and closing said opening, said panel including opposite lateral margins slidably and sealingly received in said channels, and

moisturizing means communicating with the inside of said vault, said moisturizing means including a first conduit system adapted to carry steam, a second conduit system adapted to carry water, and a blending discharge system operatively connected to said first and second conduit systems for receiving therefrom, and blending, steam and water, and for discharging such blend into said vault.

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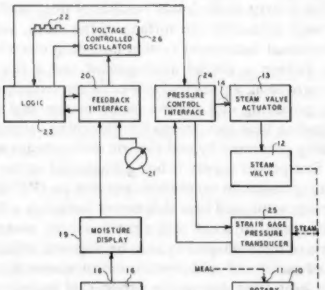
**4,302,888**

## ROTARY STEAM DRYER CONTROL

**Robert T. Boldt, Taylor Ridge, Ill., assignor to Dickey-john Corporation, Auburn, Ill.**

**Filed Feb. 26, 1979, Ser. No. 15,318**
**Int. Cl.³ F26B *23/10***
**U.S. Cl. 34—48** **16 Claims**




**1**. A product moisture control system for use in a product steam dryer of the type which removes moisture from wet product material, wherein the wet product material is contacted with steam conduit means for heating the wet material and evaporating the moisture therein and wherein the resulting evaporation is thereafter removed from the processed material, said control system comprising: moisture detecting means for determining the moisture content of the processed product material; steam pressure control means responsive to said moisture detecting means for establishing a desired steam pressure within the steam conduit means at times separated by predetermined time intervals and in accordance with the moisture content of the processed product material; steam pressure detecting means for continuously sensing the steam pressure within the steam conduit means and being coupled to said steam pressure control means for causing said steam pressure control means to maintain the steam pressure within the steam conduit means substantially at said desired steam pressure during each said predetermined time interval; and selectively adjustable timing control means for adjusting the duration of said predetermined time intervals in accordance with the throughput time of the product steam dryer.

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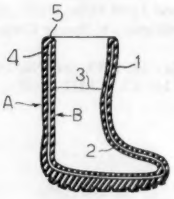
**4,302,889**

## BOOT TO BE WORN AFTER SKIING

**Celeste Negrin, Via Schiavonesca Nuova n.358, 31040 Selva Del Montello (Treviso), Italy**

**Filed Jan. 29, 1980, Ser. No. 116,576**
**Claims priority, application Italy, Jul. 11, 1979, 83418 A/79**
**Int. Cl.³ A43B *1/10***
**U.S. Cl. 36—4** **3 Claims**




**1**. In a boot having a hollow outer shell structure defining an exterior sole portion and an exterior vamp portion connected to said sole portion, said vamp portion including a circumferential collar portion through which the foot of the wearer is inserted into the boot; and an interior liner disposed to extend within said hollow outer shell structure in a normal configuration to receive the foot of the wearer, the improvement which comprises means defining a connection securing said liner to said outer shell structure along a circumferentially extending connection path and establishing between said liner and outer shell structure a totally enclosed space when the liner is within the outer shell structure in said normal configuration, said connection means allowing the liner to be removed from the outer shell structure while connected thereto to position said liner in an inside-out configuration in which the liner and outer shell structure are in opposed relation about said connection path to facilitate establishing said connection means.

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**4,302,890**

## ANTI-SLIPPING ATTACHMENT FOR SHOES

**John Covell, P.O. Box 472, Greenwood Lake, N.Y. 10925, and Laurence Brulin, Ridgefield, Conn., assignors to John Covell, Greenwood Lake, N.Y.**

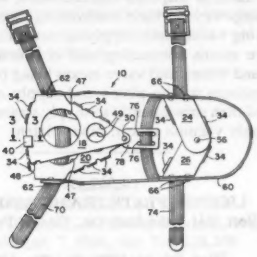
**Filed Jul. 14, 1980, Ser. No. 168,298**
**Int. Cl.³ A43B *3/10*; A43C *15/00***
**U.S. Cl. 36—7.6** **10 Claims**

**1**. An anti-slipping device adapted to be fitted under the sole of a shoe, said device having a front end adapted to be positioned proximate the front end of said sole, said device comprising:

a pair of at least partially overlapped plates, each of said plates having a front end located at the front end of said device and a rear end;

means, proximate the rear ends of said plates, for pivotting together said plates for relative rotation along each other, enabling adjustment of the width spanned by the front ends of said plates;

integral teeth projecting generally perpendicularly downward from the peripheries of said plates;



one of said plates having integral guide means extending from its front end and about the other plate for maintaining the front ends of said plates against each other; and

means carried by each of said plates for attaching said device to said shoe.

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**4,302,891**

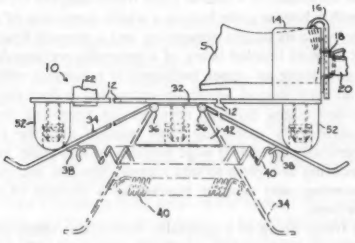
**JUMPING SHOE ATTACHMENT**

**Frank Gulli, 62 Livingston Ave., Dobbs Ferry, N.Y. 10522**

**Filed Jun. 23, 1980, Ser. No. 161,668**

**Int. Cl.³ A43B *3/10***

**U.S. Cl. 36—7.8** **2 Claims**



**1**. Improvement in a jumping shoe attachment having a sole plate and means for attaching said sole plate to a user's shoe, said improvement comprising means including a ground operative hinge device disposed beneath said sole plate for yieldably holding the jumping shoe attachment against the user's weight in an elevated position above the ground, said hinge device comprising a pair of hinge plates hinged about a pair of stationary hinge axes affixed to said sole plate, said hinge axes being both centered and spaced apart lengthwise in respect to said sole plate, the lower ends of said hinge plates being operative against the ground, said hinge device including a plurality of tension springs for predetermining the amount of force by which a pair of said jumping shoe attachments overcomes the user's weight, said tension springs being connected to the inside walls of said hinge plates for yieldably pulling them together during use of said jumping shoe attachment, said tension springs being preselectable as to number and type to accommodate the user's weight, means in the form of an elastomeric block affixed to the bottom of said sole plate between said hinge axes for limiting the amount by which said hinge plates can be pulled together, and means in the form of a pair of yieldable members for limiting the amount by which said hinge plates can be spread apart, said pair of yieldable members being disposed between the bottom of said sole plate and the outside walls of said hinge plates, respectively.

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**4,302,892**

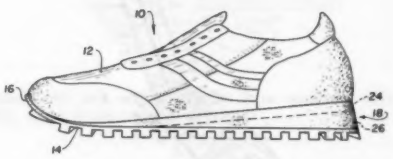
**ATHLETIC SHOE AND SOLE THEREFOR**

**Jaroslav F. Adamik, Santa Ana, Calif., assignor to Sunstar Incorporated, Garden Grove, Calif.**

**Filed Apr. 21, 1980, Ser. No. 142,476**

**Int. Cl.³ A43B *13/14***

**U.S. Cl. 36—31** **6 Claims**



**1**. An athletic shoe which is light in weight and provides firm support along the outer edges thereof comprising an upper, a hard resilient outer sole, and an intermediate sole which comprises a relatively hard closed cell foam peripheral portion along the entire longitudinal length of the shoe and underlying the outer periphery thereof, and a relatively soft closed cell foam core portion extending essentially along the entire longitudinal length of the shoe.

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**4,302,893**

**DIGGING WHEEL FOR A SUCTION DREDGER VESSEL**

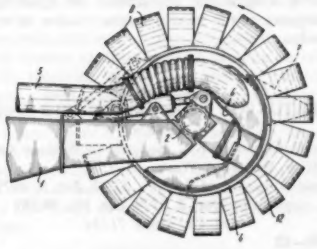
**Johannes van den Elshout, Rotterdam, and Jan Asselbergs, Krimpen, both of Netherlands, assignors to IHC Holland N.V., Papendrecht, Netherlands**

**Filed Apr. 21, 1980, Ser. No. 142,045**

**Claims priority, application Netherlands, Apr. 20, 1979, 7903124**

**Int. Cl.³ E02F *3/92***

**U.S. Cl. 37—66** **8 Claims**



**1**. In a digging wheel for a suction dredger vessel, said wheel being rotatable about a horizontal axis and having at its outer circumference a series of digging scoops regularly distributed about its circumference each one being U-shaped in a radial cross section of the wheel with the legs of the U secured to the said circumference and with an inlet opening facing forwardly in the direction of rotation, said inlet opening being larger than the outlet opening of each scoop, the said outer circumference over its entire length having a passage between the legs of the scoops which communicates with the suction mouth of a suction conduit extending into the wheel through a stationary side wall of the wheel, which suction mouth covers part of the circle of the wheel along said passage; the improvement in which the suction mouth has an extension extending through the passage into the scoops and fitting into the outlet openings

of said scoops and opening in a direction opposite the direction of rotation of the wheel.

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**4,302,894**

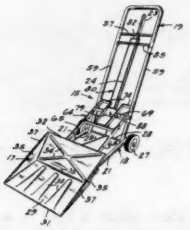
## MANUAL SHOVELLING AND DUMPING DEVICES

**Sam F. Emma, 702 Hawthorne La., Geneva, Ill. 60134**

**Continuation-in-part of Ser. No. 876,016, Feb. 8, 1978, abandoned. This application Jun. 15, 1979, Ser. No. 48,753**

**Int. Cl.³ E01H *5/02***

**U.S. Cl. 37—130** **29 Claims**



**21**. A manually operable shovelling and dumping device especially adapted for snow removal and the like, comprising:

a scoop shovel having a front scooping edge;

a mobile frame for maneuvering said scoop shovel, said frame having generally upright handle means having wheel means at its lower end;

a forward frame extension having rear pivot means connecting it to the lower end of said handle means and projecting forwardly from said handle means and having front pivot means connecting it to said shovel;

means for controlling the upstanding attitude of said handle means relative to said forward frame extension comprising a diagonal brace structure having a first portion pivotally connected, on a common axis with said front pivot means, to said forward portion of said frame extension and a second portion pivotally connected to said handle means substantially above said rear pivot means;

and means connecting the first and second portions for selective longitudinal adjustment for effecting pivotal adjustments of the handle means relative to said frame extension.

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**4,302,895**

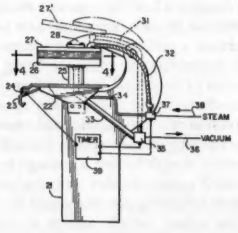
## APPARATUS FOR PROCESSING TABLE AND BED LINEN

**Don L. Pertl, Columbia, S.C., assignor to Western Automation Corporation, Redmond, Wash.**

**Continuation-in-part of Ser. No. 2,093, Jan. 9, 1979. This application Dec. 3, 1979, Ser. No. 99,661**

**Int. Cl.³ D06F *71/34***

**U.S. Cl. 38—15** **7 Claims**




**1**. Apparatus for smoothing bed and table linen and like material comprising a pair of platens, mounting means for said platens operable to displace said platens relative to one another between open and closed positions respectively, in the open position said platens operable to receive a stack of multiple layers of said material therebetween, pressure means operable in the closed position of said platens to bias said platens toward one another with a predetermined pressure to compress the stack of material disposed therebetween, said platens having fluid passageways in their confronting faces and connections for applying vacuum and supplying steam to said passageways, and valve means connecting said connections to sources of vacuum and steam, said valve means being operable to initially supply vacuum to one platen and supply steam to the other platen and then subsequently to supply steam to said one platen and to apply vacuum to said other platen.

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**4,302,896**

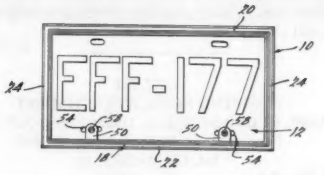
## LICENSE PLATE FRAME ASSEMBLY

**John A. Bott, 931 Lakeshore Dr., Grosse Point Shores, Mich. 48236**

**Filed Jul. 14, 1980, Ser. No. 168,539**

**Int. Cl.³ G09F *7/00***

**U.S. Cl. 40—209** **12 Claims**




**1**. In combination a license plate frame adapted for cooperation with a license plate having a width dimension of approximately twice its height dimension, and a support bracket,

said support bracket being of a generally rectangular shape and having an upper horizontally extending rolled edge and two spaced vertically extending rolled edges, said rolled edges defining recesses for receiving the upper horizontally extending edge portion and the two side vertically extending edge portions of said plate, means for securing said plate to said support bracket, and means for securing said support bracket to a portion of a motor vehicle,

said frame being of a generally rectangular shape and comprising upper and lower horizontally extending sections and vertically disposed end sections extending between and integrally connected to the opposite ends of said horizontal sections,

each of said frame sections comprising an outer enclosure wall portion arranged at substantially right angles to the plane of said license plate, and an integral frontal wall portion that extends substantially parallel to the plane of the license plate and inwardly from the forwardmost part of the associated outer enclosure wall portion,

said outer enclosure wall portions and said frontal wall portions of said upper horizontal and vertical end sections of said frame cooperating to conceal the rolled edge portions of said support bracket,

said frontal wall portions overlying the outer marginal edge portions of the forward face of said license plate and providing an unobstructed rectangular opening having linear side edges through which the forward face of the license plate may be viewed,

plate retaining flange elements formed integrally of said vertical end sections on said frame,

said flange elements defining plate edge receiving recesses with said outer and frontal wall portions of the associated frame sections and being located on the rearward side of said license plate and thus being totally concealed from

the forward side of said frame by said plate when the same is assembled into said frame,

whereby assembly of said frame to said license plate and support bracket may be achieved by positioning the vertically lowermost ends of said plate edge receiving recesses over the vertically uppermost ends of the two spaced, vertically extending rolled edges of said bracket, and then sliding said frame in a vertically downward direction toward its normal position.

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**4,302,897**

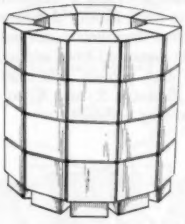
**MODULAR DISPLAY SYSTEM**

**Jonas E. Deckys, 9705 NE. 120th Pl., Kirkland, Wash. 98033**

**Filed Mar. 7, 1980, Ser. No. 128,309**

**Int. Cl.³ G09F *7/00***

**U.S. Cl. 40—605** **7 Claims**



1. A knock-down modular three-dimensional display unit which can be transported in flattened form and readily assembled at the use site, comprising:

a linear strip of sheet material of greater length than width having fold lines extending the width thereof and dividing the sheet into four panels with the end panels having terminating flaps thereon for joining the respective end panels of the linear sheet material together to form an enclosed module;

end flaps extending from each of the ends of the respective panels and joined to the respective panels by fold lines, the end flaps including means for interlocking the end flaps together to form end walls of the unit; and

tabs formed within each of the end flaps, each tab bending along the fold line joining the end flap to its respective panel, the tabs having a width along the fold line less than the width of the tab at its upper end, the tabs adapted to interlock with tabs of an adjacent modular unit in side-by-side, end-to-end or side-to-end relation to form a three-dimensional display system, the unit, when assembled, having parallel end walls so that the units can be stacked atop one another to form a display system.

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**4,302,898**

**INDIVIDUAL SAFETY FIRING BUTTON FOR GUNS**

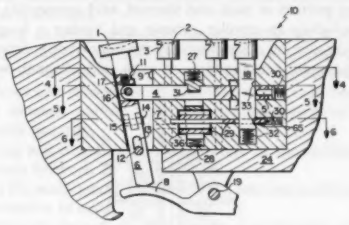
**Earl P. LaRue, 884 Murray Rd., Jerome, Mich. 49249**

**Filed May 9, 1979, Ser. No. 37,355**

**Int. Cl.³ F41C *17/00***

**U.S. Cl. 42—1 LP** **7 Claims**

1. A gun lock having an individual firing button comprising in combination a firing button, a shaft extending downwardly from said firing button, trigger means connected to said shaft, and lock means connected to said shaft whereby when said lock means is unlocked, said trigger means may be actuated,



wherein said lock means includes three positions; a lock, a safety, and a firing position.

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**4,302,899**

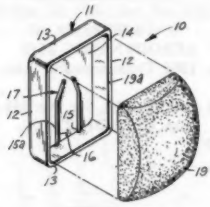
**HUNTERS AND TRAPPERS SCENT PAD**

**George DeHart, 3025 S.W. 21st, Oklahoma City, Okla. 73108**

**Filed May 29, 1980, Ser. No. 154,505**

**Int. Cl.³ A01M *3/00***

**U.S. Cl. 43—1** **1 Claim**



1. A hunter's and trappers' scent pad, comprising, in combination, a box-shaped, rectangular housing, a sponge supported in said housing and a mounting means on said housing for support from any of various objects; said housing including a pair of opposite side walls, a pair of opposite end walls and a back wall formed together, a front opening on said housing frictionally receiving said sponge; and said mounting means comprising a steel spring clip formed with a generally "U"-shaped portion that bears against an outer, rear side of said back wall, and a pair of legs that bear against an inner, front side of said back wall, said legs being inserted through a pair of spaced-apart openings formed in said housing along an edge between one said end walls and said back wall; and said sponge having a few drops of animal lure placed thereon so as to attract game.

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**4,302,900**

**NODAL ELEMENTS WITH CHANNELS FOR PUSH-FITTED RODS**

**William R. Rayner, 40 Rawson St., Epping, N.S.W., 2121, Australia**

**Filed Nov. 18, 1980, Ser. No. 208,117**

**Claims priority, application Australia, Nov. 27, 1979, PE1486**

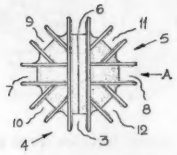
**Int. Cl.³ A63H *33/10***

**U.S. Cl. 46—29** **7 Claims**

1. A constructional toy comprising a plurality of nodal elements and a plurality of co-operating rod elements; each said nodal element being substantially spherical and having a plurality of channels formed upon its peripheral surface, including a first channel encircling said nodal element so as to pass through the poles thereof (as hereinbefore defined) and at least four other channels spaced about said peripheral surface so as to be intercepted by said first channel adjacent the poles

of said nodal element, the lips of each said channel having inwardly projecting beads thereon;

each said rod element comprising a shank having a connecting portion at each end thereof, said connecting portion including an annular groove and having a longitudinal cross-section of substantially the same configuration as the transverse cross-section of each said channel; whereby,




when a said connecting portion of a said rod element is 'push-fitted' into a co-operating channel, it is held therein by virtue of the engagement of a said lip bead within the annular groove of said connecting portion in such a manner that the longitudinal axis of the said rod element is in substantial alignment with the geometrical centre of the nodal element.

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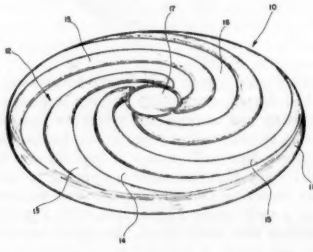
**4,302,901**
**AERODYNAMIC TOY**

**Louis G. Psyras, 1384 Commonwealth Ave., Boston, Mass. 02135**

**Filed Apr. 17, 1980, Ser. No. 141,174**
**Int. Cl.³ A63H *27/00***
**U.S. Cl. 46—74 D** **17 Claims**



**1.** An aerodynamic toy comprising a rotatable free-flight body of generally circular configuration comprising a main body portion having a generally convex upper surface and a generally concave bottom surface, a downwardly extending rim portion integral with said main body portion and defining the circumferential perimeter of the aerodynamic toy which acts in flight as a primary air foil, said rim portion having an outside surface which curves downwardly and somewhat inwardly and at least one spiral-shaped air spoiler on said convex upper surface extending outwardly from centrally of the aerodynamic toy, said at least one spiral-shaped air spoiler being defined by an involute of a predetermined fixed curve located centrally of the aerodynamic toy.

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**4,302,902**
**CLIMBING TOY**

**Alan J. Adler, 752 La Para Ave., Palo Alto, Calif. 94306**

**Continuation-in-part of Ser. No. 798,804, May 20, 1977, abandoned. This application Apr. 26, 1979, Ser. No. 33,698**
**Int. Cl.³ A63H *11/04***
**U.S. Cl. 46—132** **5 Claims**

**1.** A string climbing device consisting of:

a round body means having an axis of revolution passing through the center of gravity of said body means;

first and second annular grooves circumscribing said body means and respectively describing first and second planes which are both perpendicular to said axis of revolution, said first and second planes intersecting said axis of revolution at points which are removed from said center of

gravity by distances $X_1$ and $X_2$ respectively, said first and second grooves each having depths which are at least three times greater than their width and having respective radii $R_1$ and $R_2$ measured from said axis of revolution to the bottom of each groove, said radii $R_1$ and $R_2$ being related to the distances $X_1$ and $X_2$ so as to substantially satisfy the following equation:

$$\frac{R_2}{\Delta R} = \frac{X_2}{\Delta X}$$

where $\Delta R = R_2 - Rhd\ 1$ and $\Delta X = X_2 - X_1$; and

string means freely wound in opposite directions in each of said grooves such that tension applied to said string means causes said body means to rotate and move along said string means, and whereby any tilting moment caused by said tension is counteracted by the tilting moment caused by the offset of said center of gravity relative to the center of spacing between said first and second grooves.

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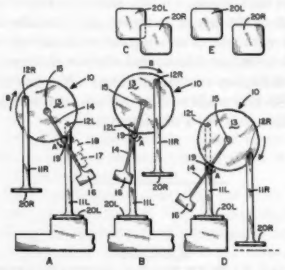
**4,302,903**
**STEPPING DEVICE**

**Kwok-Wah Pun, Kowloon, Hong Kong, assignor to Kusan, Inc., Brentwood, Tenn.**

**Filed Mar. 10, 1980, Ser. No. 129,178**
**Int. Cl.³ A63H *11/00*; F03G *3/06***
**U.S. Cl. 46—150** **6 Claims**




**1.** A stepping device which comprises:

a. a link;

b. first and second legs rotatably mounted to said link for rotation relative to said link about respective first and second spaced horizontal axes, said legs being spaced in the direction of said axes;

c. a base on each of said legs, each of said bases extending laterally on either side of a plane perpendicular to said axes through the center of gravity of the device;
d. a pendulum mounted to said link for rotation about a third horizontal axis disposed between and parallel to said first and second axes;
e. said pendulum, link and legs being constructed and arranged with respect to each other so that, when said device is supported in an upright position on said bases, the pendulum can be positioned such that the moment of said pendulum about the foremost of said first and second axes comes to exceed the counter moment thereabout, as said pendulum swings forwardly of said device, and
f. means for swinging said pendulum relative to said link forwardly about said third axis, to thereby move said legs in a stepping motion.

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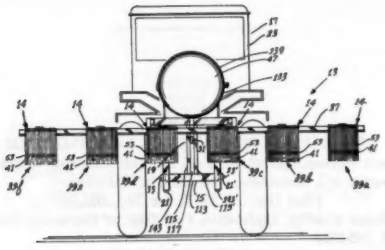
**4,302,904**
**AGRICULTURAL APPLICATOR APPARATUS**
**Harold C. Mead, Charles City, Iowa, assignor to Nixdorff Krein Industries, Inc., St. Louis, Mo.**
**Filed Jun. 21, 1979, Ser. No. 50,652**
**Int. Cl.³ B05C *1/00***
**U.S. Cl. 47—1.5** **30 Claims**



1. Apparatus for selectively applying an agricultural treatment liquid to target vegetation comprising a structure adapted for being carried by an agricultural implement, a plurality of applicators of flexible textile material, said applicators each comprising a wig of absorbent textile material configured to provide a forwardly opening recess for receiving and at least partly surrounding foliage of said target vegetation and for contacting foliage of said target vegetation without damage, constituted by means for spraying said treatment liquid toward the foliage of target vegetation within said recess, and apron means associated with each said wig for parting foliage of said target vegetation as said target vegetation passes into said recess for spraying, said apron means comprising a further wig of textile material, means securing said applicators to said support structure in spaced relationship for contacting target vegetation in rows during travel of said implement along said rows, and means for providing a supply of said treatment liquid for application to said target vegetation.

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**4,302,905**
**GROWING CELLS OF PLANTS IN A MULTI-MEDIA HYDROPONIC ENVIRONMENT**
**Vesper A. Vaseen, 9840 W. 35th Ave., Wheat Ridge, Colo. 80033**
**Filed May 5, 1980, Ser. No. 146,227**
**Int. Cl.³ A01G *31/02***
**U.S. Cl. 47—58** **1 Claim**

1. I claim a method of growing clones and diversifying cells of plants by use of a multi-media hydroponics consisting of an aqueous nutrient solution in conjunction with an inert, non-ionic liquid saturated with non-ionic carbon dioxide gas; consisting of:
growing laboratory cultures of acclimated callus or diversifying plant cells, by the method of,
dissolving predetermined quantities of mineral nutrients salts in a sterile aqueous solution, thereby,
providing a nutrient solution conducive to plant cell growth,
injecting laboratory cultured starter or seed cells into the nutrient solution,
saturating an inert, non-ionic liquid, preferably a polyorganosiloxane or flourocarbon with carbon dioxide gas,
mixing the carbon dioxide saturated inert liquid with the aqueous cell suspension to provide via the absorbed carbon dioxide, carbon sufficient for predetermined cell growth quantity,
adjusting and retaining the temperature of the multi-media mixture between 20° C. and 30° C.,
mixing the multi-media suspension at a rate not mechanically destructive of cells,
providing photosynthesis light energy at an intensity of from 100 to 2,000 foot candles at the liquid surface,
removing carbon dioxide spent inert liquid and replacing said liquid with renewed carbon dioxide saturated liquid periodically, as required to satisfy mitosis and separating and removing cells from the liquid.

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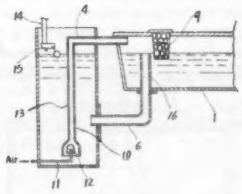
**4,302,906**
**SOILLESS CULTURE DEVICE**
**Hidehiko Kawabe, Hirakata; Yozo Yoshino, Yawata, and Yozo Jizodo, Kasuga, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Filed Apr. 21, 1980, Ser. No. 142,119**
**Int. Cl.³ A01G *31/02***
**U.S. Cl. 47—62** **6 Claims**



1. A soilless culture device comprising a culture solution tank, a cultivation vessel providing a flow path for a culture solution fed from said solution tank, said solution flow path having forward and return path portions connected at one end thereof to a feed pipe and to a reflux pipe respectively and communicating with each other at the other end, at least one short-circuiting means for communication between said forward and return path portions at any selected point, and means for forcibly feeding culture solution together with bubbles to said feed pipe from the solution tank.

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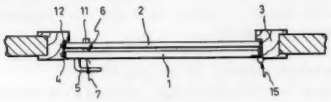
**4,302,907**
**SELECTIVELY INTERLOCKED DOUBLE SECURITY DOORS**
**Jose M. Canals, and Ramon M. Canals, both of Virgen del Pilar 32, Tarrasa (Prov. Barcelona), Spain**
**Filed Oct. 5, 1979, Ser. No. 82,362**
**Claims priority, application Spain, Oct. 13, 1978, 474.204; May 25, 1979, 480.942; May 25, 1979, 480.943**
**Int. Cl.³ E05B *65/04*; E05C *7/02***
**U.S. Cl. 49—65** **9 Claims**

1. Personal security door arrangement, characterised in that there is disposed in a fixed door frame a conventional inner door juxtaposed to an outer protective door affording complete visibility therethrough and allowing the passage of small objects, said doors being hingedly mounted to the door frame at the same side, rotating in the same direction and each having its own lock and having:
(a) mutual coupling means for the two doors, with actuating means for the outer door from the inner door, interlock-

able by hand and automatically releasable on closing the door, which means, after the inner door has been opened to permit observation and has been of necessity closed again, are actuated voluntarily, thereby opening and retaining the outer door lock and opening both doors together;

(b) interlocking means for the coupling means mounted in the inner door;



(c) retaining means holding both doors coupled together in the open position;

(d) releasing means automatically disengaging both doors on their being closed; and

(e) an outer door blocking means, blocking the bolts thereof when the inner door is open.

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**4,302,908**

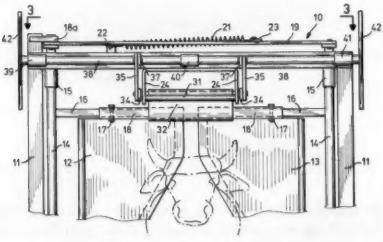
## LIVESTOCK DETAINING GATE

**Donald D. Parker, Orem, Utah, assignor to Powder River Enterprises, Inc., Provo, Utah**

**Filed Apr. 16, 1979, Ser. No. 30,476**

**Int. Cl.**[3] **E05C** *7/06;* **E05F** *17/00*

**U.S. Cl. 49—122** **5 Claims**



1. A livestock detaining gate for controlling movement of livestock, comprising in combination:

a gate frame comprising a top and two vertical side members;

a pair of gate panels, mounted respectively on each of horizontally spaced parallel hingedly mounted vertical rod members of said gate frame;

a pair of parallel cross support members, each being attached at either end respectively to each side of the top ends of said gate frame;

biased cantilever means connecting upper edges of said gate panels for controlling the swing and position of said gate panels;

a rotatable control bar attached to said frame in a position parallel to the front edge of said cross support members, having vertical arm extensions affixed at respective ends of said bar;

a support frame the base of which comprises a rectangular surface having its upper face affixed to the bottom side of said parallel cross support members, and having a pair of support panels extending vertically downwardly on each of the two respective sides of said support frame;

a pair of latch stop rods, one rod being perpendicularly connected to the inside lower front portions of said support panels, and the other rod similarly connected to the lower back portions of said support panels, in parallel relationship to each other;

a pair of cylinder support rods in parallel relationship to each other and to said pair of latch stop rods, and extending through vertical slots in the front and rear portions of said support panels, with said slot in one panel being aligned with the corresponding slot in the respective portion of the opposite support panel;

cantilever lift means being connected to said control bar, and responding to rotation of said control bar by lifting one of a pair of cylinder latches respectively mounted on said cylinder support rods thereby permitting said gate panels to swing in a predetermined direction; and

a pair cylinder latches, each consisting of a cylinder suspended horizontally from each of said pair of cylinder support rods said cylinders being of a circumference such that when said control bar is in the closed position, pressure against said gate panels forces said cylinder against said latch stop rod, preventing said gate panels from opening and when said control bar is in the open position, said cylinder is raised above said gate panels, permitting said panel to swing open in the direction of the raised cylinder; and

position limiting means on one of said vertical rod members for limiting the distance which said gate panels open.

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**4,302,909**

## STRESSED INTERNAL FACE LAPPING TOOL

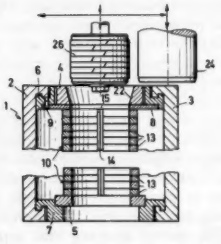
**Hubert Dörner, Burscheid, Fed. Rep. of Germany, assignor to Goetze AG, Burscheid, Fed. Rep. of Germany**

**Filed Dec. 14, 1979, Ser. No. 103,602**

**Claims priority, application Fed. Rep. of Germany, Dec. 20, 1978, 2854952**

**Int. Cl.**[3] **B24B** *25/00*

**U.S. Cl. 51—157** **9 Claims**



1. In an apparatus for lapping an external circumferential arcuate face of a workpiece; the apparatus including a sleeve-like lapping tool having an inner face constituting a lapping surface; the improvement wherein the tool has a throughgoing slot to provide for a circumferential discontinuity in said tool and further wherein said tool is radially resiliently expandable; the improvement further comprising axial clamping means for immobilizing said tool; said clamping means having a tightened state in which said tool is immobilized in a radially outwardly deformed condition, whereby said tool, in said tightened state, has internal stresses tending to cause a radially inward contraction of said tool; said clamping means having a released state in which said tool is allowed to contract radially inwardly for circumferentially conforming about an outer face of a calibrating member temporarily positioned within said tool, whereby the inner diameter of said tool is calibrated to a desired working diameter of said apparatus.

## 4,302,910
## PNEUMATICALLY OPERATED GRINDING APPARATUS

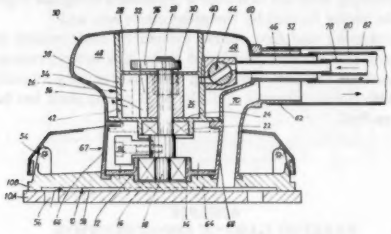
**Hans-Dieter Tschacher, Reichenbach, Fed. Rep. of Germany, assignor to Festo-Maschinenfabrik Gottlieb Stoll, Esslingen, Fed. Rep. of Germany**

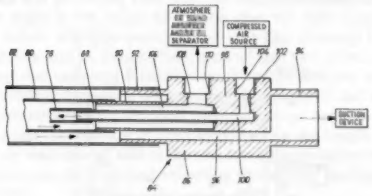
**Filed Feb. 27, 1980, Ser. No. 125,391**

**Claims priority, application Fed. Rep. of Germany, Mar. 1, 1979, 2907930**

**Int. Cl.³ B24B** *23/00, 55/06*

**U.S. Cl. 51—170 MT** **10 Claims**






1. In a pneumatically operated grinding apparatus having dust removal means, comprising an apparatus housing, in which a work plate which is driven by a compressed-air motor is movably supported, an inlet piping connection for compressed air connected in fluid circuit with an inlet opening of said compressed-air motor, a suction piping connection which is connected to the inside of the apparatus housing and to which a suction device can be connected, and a discharge-air piping connection which is connected to an outlet of said compressed-air motor, each of said inlet opening, said discharge-air piping and said suction piping means including passageway means to the exterior of said apparatus housing, the improvement comprising wherein said discharge-air piping connection surrounds said inlet piping connection, wherein said suction piping connection surrounds said inlet piping connection and said discharge piping connection, wherein separate flexible hoses are sealingly connected to said inlet piping connection, said discharge-air piping connection and said suction piping connection, wherein an adapter is provided, to which each of said flexible hoses, which come in the same direction from said inlet piping connection, said discharge-air piping connection and said suction piping connection, are sealingly connected, said adapter having separate axially arranged hose connecting tubes, one sealingly connected to said hose extending to said inlet piping connection, another sealingly connected to said hose extending to said discharge-air piping connection and still another sealingly connected to said hose extending to said suction piping connection, said adapter further having outlet openings aligned in different direction for connection to a compressed-air source, a discharge-air port and a suction device.

## 4,302,911
## ROTARY FLAP WHEEL TYPE GRINDING TOOL WITH OUTWARDLY FLARING FLAPS

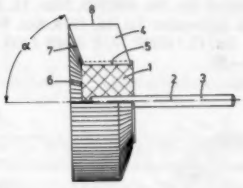
**Güter Leistner, Marienheide, Fed. Rep. of Germany, assignor to Firma August Rüggelberg, Marienheide, Fed. Rep. of Germany**

**Filed Jan. 22, 1980, Ser. No. 114,299**

**Claims priority, application Fed. Rep. of Germany, Feb. 13, 1979, 7903893[U]**

**Int. Cl.³ B24D** *13/04*

**U.S. Cl. 51—334** **12 Claims**



1. A rotary peripheral grinding tool having a rotary axis, the tool comprising a central core positioned concentrically with respect to said rotary axis; means for peripheral grinding comprising lamellae having respective roots and made of support mesh coated with grinding material secured along the total length of said roots in said central core, and said lamellae extending radially outwardly from said core in axial planes passing through said rotary axis, said lamellae having a cylindrical outer contour, with outer longitudinal edges parallel to said rotary axis for enabling their use as peripheral grinding means in work-pieces having angled areas forming a non-obtuse inside angle, said lamellae further increasingly projecting axially beyond at least one axial end face of said core with increasing distance from said rotary axis starting from said respective roots fixed in said core, and means for securing the tool in a rotary grinding machine.

## 4,302,912
## TROUGH BELT CLEANING APPARATUS ADAPTED FOR RADIAL FEEDING

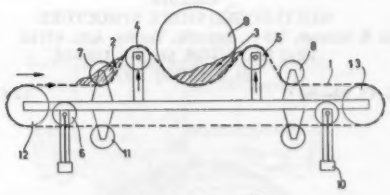
**Horst-Dieter Schlick, Metelen, Fed. Rep. of Germany, assignor to Schlick-roto-jet Maschinenbau GmbH, Metelen, Fed. Rep. of Germany**

**Filed Mar. 13, 1980, Ser. No. 129,998**

**Claims priority, application Fed. Rep. of Germany, Mar. 19, 1979, 2910754**

**Int. Cl.³ B24C** *1/00, 3/18*

**U.S. Cl. 51—418** **9 Claims**



1. A trough belt cleaning apparatus adapted to be continuously fed with articles in radial direction, particularly a blasting system, wherein the articles to be cleaned are placed onto a belt and discharged from the latter when the cleaning operation has been performed, characterized in that said belt (1) defines, as seen in the direction of belt travel, first a receiving or collecting trough (2) and a subsequent, downstream processing trough (3), with said processing trough (3) being de-

fined or bounded on the upstream and downstream sides, as seen in belt travelling direction, by guide pulleys (4, 5) acting to deflect said belt (1) during the processing operation, and that said pulleys (4, 5) are adapted to be raised and lowered while said belt is travelling.

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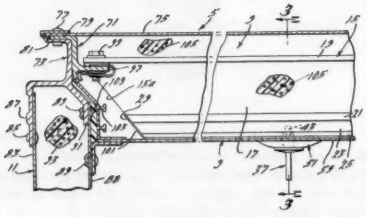
**4,302,913**

## ROOF STRUCTURE HAVING MEAT RAIL HANGERS

**Robert B. Schwartz, Grosse Pointe Woods; Frank J. Miller, Warren, and Hem R. Vij, Fraser, all of Mich., assignors to Freuhauf Corporation, Detroit, Mich.**

**Continuation of Ser. No. 886,993, Mar. 16, 1978, abandoned.**
**This application Jul. 26, 1979, Ser. No. 60,774**
**Int. Cl.³ G09F *7/18*; E04B *1/00, 1/38***
**U.S. Cl. 52—39** **10 Claims**



1. A roof structure for a vehicle having at least two spaced apart sidewalls, defining an interior space therebetween, each of which has a top ledge, comprising: a longitudinally extending Z-shaped rail, one leg of which extends outwardly over said top ledge, the other leg of which extends inwardly of the sidewall, a plurality of spaced apart transverse beams each having a top flange, the end of which is fastened to rail inwardly extending leg of said Z-shaped rail, whereby said beam top flanges lie in a plane below the sidewall top ledges, said transverse beams each having oppositely extending spaced apart bottom flanges forming the bottom wall of a chamber having an access slot formed by the space between the flanges and spaced apart upwardly facing shoulders formed by the top face of said oppositely extending flanges, said access slot having spaced apart enlargements of generally predetermined cross section, individual hangers in said individual enlargements, said hangers having a shank portion of a width greater than that of said slot, a head portion of a width less than said slot, and a bottom portion outwardly of said slot having a load attachment surface thereof, whereby the roof structure can be pre-assembled and lowered onto the top ledge.

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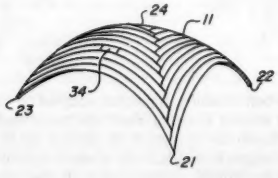
**4,302,914**

## MULTI-EDGED SHELL STRUCTURE

**John S. Sumner, 728 N. Sawtelle, Tucson, Ariz. 85716**

**Filed Feb. 7, 1980, Ser. No. 119,484**
**Int. Cl.³ E04B *1/32***
**U.S. Cl. 52—80** **12 Claims**




1. A method of covering a multi-edged spherical surface, the edges of which comprise outwardly leaning great circle arcs, the method comprising the steps of:

dividing the surface into sectors one associated with each edge of the surface,

forming conical strips of a building material shaped to simulate, when assembled, the outer periphery of the spherical surface,

forming the ends of each strip in a given course utilizing a trapezoidal projection so as to adjoin with an adjacent strip in said course,

assembling the conical strips of each sector in courses commencing with the first course positioned along the edge of the sector formed by the great circle arc, and

overlapping said first course formed by said conical strip with successively positioned strips of a second course in each sector and continuing said overlapping operation with further courses until the apex of the shell has been reached.

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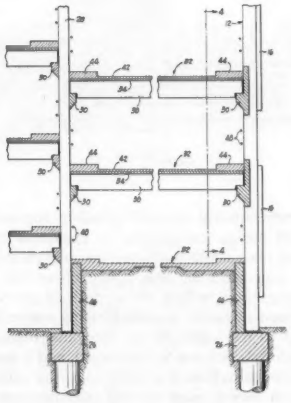
**4,302,915**

## PARKING GARAGE CONSTRUCTION

**Gerald R. Stocks, North Ridgeville, Ohio, assignor to Apcoa, Inc., Cleveland, Ohio**

**Filed Apr. 30, 1979, Ser. No. 34,369**
**Int. Cl.³ E01F *9/00***
**U.S. Cl. 52—175** **7 Claims**



1. A parking garage having precast portions and characterized by a substantial lack of horizontally extending beams, the garage comprising:

(a) a plurality of vertically extending columns, the columns arranged in files and those columns forming the external walls of the building comprising:

(i) first portions laterally offset with respect to the column centerline;

(ii) second portions laterally offset with respect to the column centerline, the offset portions alternating vertically and any given offset portion being either projected or recessed with respect to the offset portions immediately above and below it; and

(iii) haunches projecting outwardly of the columns, the haunches extending toward haunches of columns in files oppositely disposed, each haunch facing a corresponding haunch disposed at about the same vertical level; and

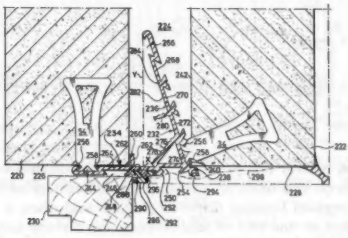
(b) slabs extending between columns oppositely disposed and resting on haunches, adjacent slabs along their sides being substantially abutted to form a largely uninterrupted surface.

4,302,916

## DAMP-PROOF COURSES AND STRUCTURAL ASSEMBLIES INCLUDING DAMP-PROOF COURSES

George Molyneux, Plymouth, England, assignor to Radway Plastics Limited, West Midlands, England

Filed May 23, 1979, Ser. No. 41,618
Claims priority, application United Kingdom, May 31, 1978, 25159/78
Int. Cl.[3] E06B 1/26
U.S. Cl. 52—213 14 Claims



1. A damp-proof course for use at the end of a cavity wall of a building structure which abuts the frame of a door or window, comprising a strip of corrosion-resistant, moisture impermeable material having a constant cross-section throughout its length, and providing two web-like elements arranged at an acute angle in the range 45° to less than 90° with respect to each other, whereby each of said web-like elements has an inside face and an outside face, each of said two webs having at least one undercut formation on its inside face and at least one undercut formation on its outside face, each of said undercut formations being identical in cross-section and providing anchorage for wall ties at any position along the length of the strip, at least one of said webs also having a moisture barrier formation on its inside and extending throughout the length of said strip.

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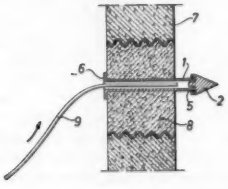
4,302,917

## METHOD AND MEANS FOR FIRE-SEALING A PENETRATION FOR A CONDUIT

Leif A. Fermvik; Bo E. Ohlsson, and Aage E. Skinstad, all of Nyköping, Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Sep. 11, 1979, Ser. No. 74,383
Claims priority, application Sweden, Sep. 15, 1978, 7809749
Int. Cl.[3] E04B 5/48
U.S. Cl. 52—221 9 Claims



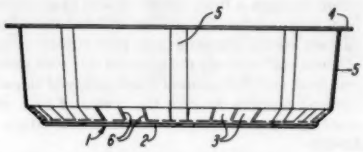
1. A means for fire-sealing a penetration for a conduit through a building part, comprising a cast building member having a prefabricated body comprising a tubular jacket filled with a resilient, fire-resistant foam material, said jacket keeping the foam material compressed transverse to the longitudinal axis of the jacket, said body being intended for placing in the member in conjunction with casting the latter, so that a conduit can be passed through the foam material of the cast-in body.

4,302,918

## PLUG

Matti Rautilo, Hyryld, Finland, assignor to Paraisten Kalkki Oy - Pargas Kalk Ab., Nastola, Finland

Continuation of Ser. No. 714,347, Aug. 16, 1976, abandoned.
This application Jul. 20, 1979, Ser. No. 59,393
Claims priority, application Finland, Aug. 20, 1975, 752361
Int. Cl.[3] E04C 2/04
U.S. Cl. 52—421 5 Claims



1. A plug adapted to be inserted into the ends of a channel in a slab and engage the wall of the channel comprising a unitary structure of plastic material having a flat disk-shaped portion with a perimeter corresponding in shape to the cross-section of the channel in the slab, the perimeter of said disk-portion being smaller than the cross-section of the channel in the slab, said unitary structure having a plurality of elongated fingers extending from the perimeter of the disk-portion, each of said fingers being planar and extending at an acute angle to the disk-portion, said fingers diverging from a central axis traversing normally the center of the disk-portion and being spaced from each other to form slots through therebetween, which permit water to drain freely through the plug said fingers extending from the disk-portion to a surface corresponding in shape to the channel and having a cross-section greater than the cross-section of the channel, and said fingers being resiliently yieldable to forces exerted thereon in a direction toward the central axis of the disk-portion, whereby insertion of the plug into the channel distorts the fingers, a plurality of limiter arms, means mounting the limiter arms on the disk-portion and positioning said arms generally normal to the disk-portion, and an outwardly extending projection on the end of each of the limiter arms adapted to engage the surface of the slab when the plug is fully inserted into a channel thereof.

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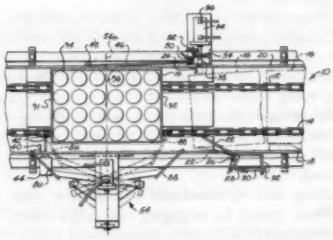
4,302,919

## CASE CENTERING DEVICE

Thomas S. Hartness, Greenville, S.C., assignor to Hartness International, Inc., Greenville, S.C.

Filed Mar. 23, 1979, Ser. No. 23,166
Int. Cl.[3] B65B 21/18
U.S. Cl. 53—250 5 Claims



1. An apparatus for centering an empty case having front, rear and side walls below an article loading device for being loaded with articles carried in a predetermined position on said article loading device comprising:

means for feeding said case forwardly with said front wall

facing forward to a first position below said article loading device,

a pair of spaced inclined means carried adjacent one side of said case when said case is in said first position;

said inclined means being inclined relative to a side wall of said case;

a guide rail carried adjacent a side wall of said case opposite from the side that said pair of inclined means are located;

means for moving said pair of spaced inclined means laterally towards said case so that one of said pair of inclined means engages a front corner of said case adjacent said front wall and the adjacent side wall and the other of said inclined means engaging said rear corner of said case adjacent rear wall and the adjacent side wall shifting said case from said first position rearwardly and sideways to a centered position wherein the center of said case is in vertical alignment with the center of said article loading device;

said means for moving said pair of spaced inclined means laterally also causes said inclined means to shift said leading case laterally into engagement with said guide rail.

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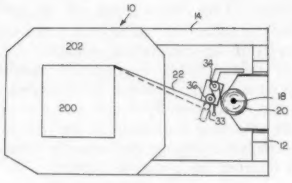
**4,302,920**

## FILM WEB DRIVE STRETCH WRAPPING APPARATUS AND PROCESS

**Patrick R. Lancaster, Anchorage, and William G. Lancaster, Louisville, both of Ky., assignors to Lantech Inc., Louisville, Ky.**

**Filed Nov. 21, 1979, Ser. No. 96,384**
**Int. Cl.³ B65B *11/04***
**U.S. Cl. 53—399** **34 Claims**




**1**. A process of making a unitary package by wrapping a load comprising the steps of:

a. positioning a roll of stretchable plastic material on a dispenser means adjacent to said load;

b. withdrawing a leading end of said plastic material from said dispenser means through a material web pre-stretching means comprising an upstream roller means and a downstream roller means;

c. holding said plastic material adjacent said load;

d. substantially synchronizing the relative surface speed of said material in said pre-stretching means to the surface speed of said load by relative rotation of the load and said dispensing means causing the film web to be pulled partially around the surfaces of said upstream and downstream roller means of said pre-stretching means, said upstream and downstream roller means being interconnected;

e. rotating said upstream and downstream roller means at different speeds by engaging said roller means with said moving material thereby driving said roller means, the downstream roller means transporting the material at a faster rate of speed than the upstream roller means causing the material web to incur substantial elongation between said upstream and downstream roller means; and

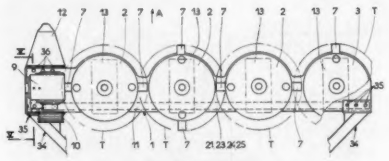
f. wrapping the load with more than one revolution of previously elongated material.

**4,302,921**

## MOWER WITH BOTTOM-DRIVEN CUTTER DISCS

**Marcel Weber, Marmoutier, France, assignor to Societe Samibem, S.A., Marmoutier, France**

**Division of Ser. No. 913,074, Jun. 6, 1978, Pat. No. 4,231,216.**
**This application Apr. 30, 1980, Ser. No. 146,199**
**Claims priority, application France, Jun. 15, 1977, 77 18776**
**Int. Cl.³ A01D *35/264, 55/18***
**U.S. Cl. 56—13.6** **2 Claims**




**1**. A mower comprising a plurality of bottom-driven discs, cutters on said discs, means securing said cutters on said discs, an elongated housing disposed beneath said discs, a transmission box at one end of said housing for driving said discs in rotation, and a beam for increasing the rigidity of said housing, said beam being disposed in said housing and extending lengthwise of said housing at least to said box and said disc closest thereto, means at said one end of said housing for connecting said mower to a driven vehicle, said beam being disposed between the axes of rotation of the discs and the axes of said securing means when said securing means are disposed farthest to the rear in their paths of rotation, and means fixedly fastening said beam to said transmission box.

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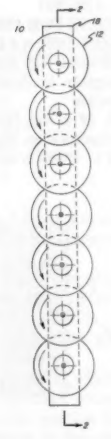
**4,302,922**

## PRUNING BOOM

**H. Fred Guerndt, Jr., Avon Park, and Kenneth E. Thompson, Wauchula, both of Fla., assignors to Orange Enterprises, Inc., Wauchula, Fla.**

**Filed Jul. 7, 1980, Ser. No. 166,236**
**Int. Cl.³ A01D *55/18***
**U.S. Cl. 56—235** **8 Claims**




**1**. A pruning boom for pruning or trimming trees, bushes, shrubs and the like, comprising:

(a) a saw carrying member;

(b) a plurality of circular saw blades, each fixed to one end of a drive shaft rotatably positioned in a support bearing;

(c) means for mounting said support bearings such that each of said circular saw blades is positioned for rotation in a

spatial plane which intersects the spatial plane containing the surface of said saw carrying member located immediately behind said circular saw blades at an identical non-perpendicular angle; and

(d) means for rotating said drive shafts.

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**4,302,923**

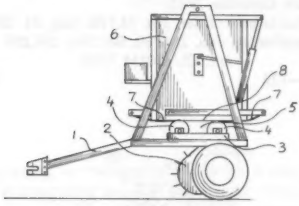
## METHOD FOR MAKING LARGE RECTANGULAR BALES

**Joseph Molitorisz, 624 81st Ave. NE., Bellevue, Wash. 98004**

**Continuation-in-part of Ser. No. 67,187, Aug. 16, 1979, Pat. No. 4,270,446, which is a continuation-in-part of Ser. No. 923,829, Jul. 12, 1978, Pat. No. 4,175,487. This application Dec. 3, 1979, Ser. No. 99,642**

**Int. Cl.³ A01D *35/00*; B30B *15/32***

**U.S. Cl. 56—341** **6 Claims**




1. A method for forming substantially rectangular bales of fibrous material comprising the steps of; forming and transferring a continuous mat of the fibrous material along a feed opening through a primary pickup and a feeder-compactor mechanism into a bale chamber which is located above the said feeder-compactor mechanism, sad mat of said fibrous material transferred into the confined cavity of said bale chamber through its bottom boundary which is an open intake port, as said bale chamber performs a reversing or oscillating pendulum like motion relative to the said feeder-compactor mechanism, the confined cavity of said bale chamber and the said feed-opening remaining merged with each other without interruption throughout the reversing or oscillating motion of said bale chamber, allowing the continuous transfer and deposition of said mat of the fibrous material in folded-like arrangement in said confined cavity of said bale chamber at its bottom boundary between retaining belts, or the like, and the bottom layer of the partially completed bale, said partially completed bale being allowed to move in an upward direction within the confined cavity of the said bale chamber as subsequent new layers are being transferred and deposited, said subsequently transferred and deposited layers of the fibrous material being subjected to gradually increasing compressive forces exerted by the increasing weight of the partially completed bale and by frictional forces between the upward moving partially completed bale and the boundaries of the bale chamber, said upward movement of the partially completed bale not being restricted by movable platen, said deposited folded layers of said fibrous material being compressed to a desired density of the bale by said feeder-compactor mechanism after the upward movement of the partially completed bale is no longer allowed by the upper boundary of the said bale chamber while the transfer and deposition of additional layers is being continued.

**4,302,924**

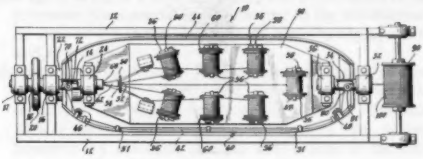
## WIRE STRANDING APPARATUS

**Gerhard H. Faulstich, Spartanburg, S.C., assignor to International Wire Products Company, a Division of Carlisle Corporation, Wyckoff, N.J.**

**Filed Nov. 20, 1979, Ser. No. 96,140**

**Int. Cl.³ D07B *3/12*; D01H *7/86***

**U.S. Cl. 57—58.52** **4 Claims**



1. Apparatus for stranding wire comprising

a support frame,

a first shaft bearing means affixed to one end of said frame, and a second shaft bearing means affixed to the end of said frame opposite that at which said first shaft bearing means is located,

separate shafts rotatably positioned in each of said shaft bearing means, said shafts being coaxial with each other and including strand passage means,

spool cradle support bearing means rotatably affixed to the innermost ends of each of said shafts,

a spool cradle, adapted for supporting a plurality of spools thereon with one of said spools positioned with its axis normal to an imaginary flat plane which includes the axes of said shafts while being normal to the plane of said spool cradle and with the remainder of said spools positioned in two linear arrays which are on opposite sides of said imaginary flat plane and substantially equidistantly spaced apart therefrom at corresponding locations between said shafts along said imaginary flat plane, affixed at each of its ends to one of said spool cradle support bearing means,

a twisting frame having at least one arm, each end of which is affixed to one of said shafts between said frame and said cradle, which arm includes strand guide means and is so dimensioned and configured as to pass between said frame and said cradle as it moves upon rotation of shafts,

and finished strand take-up means, whereby wires may pass from spools supported by said cradle into the strand passage means of one of said shafts and, as said frame rotates while said cradle remains unrotating, be twisted into a strand, passed along said guide means from one end to the other end of said arm, passed through the strand passage means in the other of said shafts, further twisted, and taken up through operation of said take-up means.

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**4,302,925**

## MULTI-COMPONENT SPUN YARN AND METHOD AND APPARATUS FOR MANUFACTURING SAME

**Hiroshi Edagawa; Toshinori Fujita, both of Ohtsu, and Yasuo Uesugi, Shiga, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan**

**Division of Ser. No. 934,806, Aug. 18, 1978, Pat. No. 4,219,996. This application Nov. 30, 1979, Ser. No. 98,843**

**Claims priority, application Japan, Aug. 23, 1977, 52-100969; Aug. 23, 1977, 52-100970; Aug. 23, 1977, 52-100973**

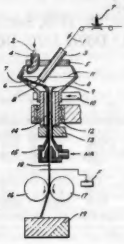
**Int. Cl.³ D01H *7/882***

**U.S. Cl. 57—58.95** **14 Claims**

1. In a method for manufacturing a multi-component spun yarn wherein staple fibers are fed continuously into a spinning system utilizing air and the centrifugal force of a rotary spinning chamber to produce a staple yarn core, the steps which comprise:

(a) further continuously feeding a separate continuous yarn into the rotary spinning chamber, and wrapping said con-

tinuous yarn about the staple fibers in said chamber as said fibers are concurrently wrapped about each other, thereby producing a multi-component spun yarn wherein said



continuous yarn is wrapped around a spun yarn formed of said staple fibers, and

(b) controlling the feed tension of said continuous yarn to a value satisfying the following limitation:

$$0.1 \leqq \frac{T_f}{T_s} < 0.9$$

where $T_f$ designates the feed tension of said continuous yarn, and $T_s$ designates the yarn tension of said staple yarn core under the existing running conditions but in the absence of said continuous yarn feed.

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**4,302,926**

## MULTI-COMPONENT YARN AND METHOD OF APPARATUS FOR ITS MANUFACTURE

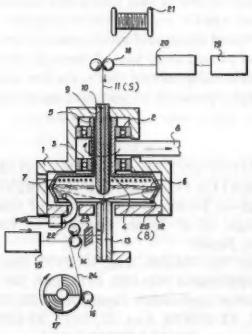
**Vaclav Maixner, Dolni Dobrouc; Zdenek Miklas, Ceska Trebova; Frantisek Velinsky, Usti nad Orlici; Cestmir Rypka, Ceska Trebova; Premysl Vorisek, Chocen; Vaclav Rohlena, and Vaclav Divis, both of Usti nad Orlici, all of Czechoslovakia, assignors to Vyzkumny ustav bavlnarsky, Usti nad Orlici, Czechoslovakia**

**Filed Dec. 28, 1979, Ser. No. 107,770**

**Claims priority, application Czechoslovakia, Dec. 28, 1978, 9054-78; Oct. 29, 1979, 7348-79; Oct. 29, 1979, 7349-79**

**Int. Cl.[3] D01H *7/882***

**U.S. Cl. 57—58.95** **4 Claims**



**1**. A method of producing multi-component yarn comprising a core component consisting of open end yarn formed from staple fibers and at least one other component made from a longitudinal formation, the open end yarn being wrapped at its surface in the direction of its twist by at least one longitudinal formation, the original character of said longitudinal formation being maintained in the multi-component yarn, said method comprising the steps of producing within a continuously rotating spinning chamber an open end yarn from fibers supplied to the internal collecting surface of said spinning chamber, taking-up said open end yarn by way of a take-up channel at a certain takeup speed substantially along the rotation axis of the spinning chamber, and winding on this open end yarn at least one longitudinal formation passing through said spinning chamber substantially along its rotation axis and entering the inlet of the take-up channel at a higher speed than the open end yarn, the open end yarn passing directly from the internal collecting surface to the rotation axis of the spinning chamber and not engaging any object until it contacts the longitudinal formation substantially on the rotation axis of the spinning chamber.

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**4,302,927**

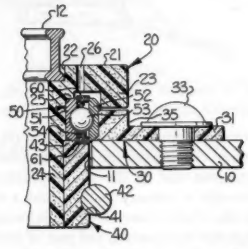
## SHOCK-ABSORBING THERMOPLASTIC SUPPORT FOR ROTATING SPINNING RING

**William K. Hope, Sr., Gastonia, N.C., assignor to H H & F Enterprises, Gastonia, N.C.**

**Continuation-in-part of Ser. No. 71,720, Aug. 31, 1979. This application Jun. 2, 1980, Ser. No. 155,298**

**Int. Cl.[3] D01H *7/58***

**U.S. Cl. 57—122** **10 Claims**



**1**. In a spinning frame including a ring rail having at least one opening therein for receiving a spinning ring supported for rotation at said opening in said ring rail, the combination therewith of a improved support assembly for said spinning ring comprising a spinning ring holder formed of shock-absorbing and vibration-dampening thermoplastic material, said spinning ring holder including an upper circular base including inner and outer peripheral surfaces with means for supporting said spinning ring in said inner peripheral surface of said circular base, a peripheral flange formed integral with said circular base and extending downwardly therefrom, a mounting bracket fixed on said ring rail and including an inner peripheral vertical flange surrounding said opening, said mounting bracket also being constructed of shock-absorbing and vibration-dampening thermoplastic material, ball bearing means including an outer race supported in said inner peripheral vertical flange of said mounting bracket and extending above the level of said inner peripheral vertical flange, the lower surface of said peripheral flange of said spinning ring holder terminating at approximately the medial portion of said outer race of said ball bearing means to define a clearance space extending inwardly between the lower surface of said peripheral flange of said spinning ring holder and the upper surface of said inner peripheral vertical flange of said mounting bracket, and an inner race supporting said spinning ring holder for rotation, and drive means for rotating said spinning ring holder.

**4,302,928**

## SPINNING OR TWISTING SPINDLE WITH A ONE-PIECE SPINDLE TOP AND METHODS FOR MANUFACTURING SAME

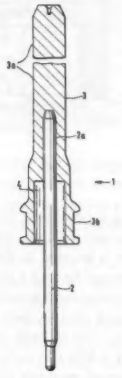
**Hans Stahlecker, Süssen, Fed. Rep. of Germany, assignor to Spindelfabrik Süssen, Schurr, Stahlecker und Grill GmbH, Süssen, Fed. Rep. of Germany**

**Filed Jun. 13, 1979, Ser. No. 48,026**

**Claims priority, application Fed. Rep. of Germany, Jun. 15, 1978, 2826152**

**Int. Cl.³ D01H *7/04***

**U.S. Cl. 57—130** **6 Claims**




**1.** A spinning or twisting spindle with a one-piece metal spindle top comprising a spindle shank and a whirl, said spindle top being connected to a shaft in a manner precluding relative rotation therebetween, wherein the spindle top is a die cast part made of an aluminum alloy, wherein the aluminum alloy contains more than 12% silicon.

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**4,302,929**

## HAIRY MONOCOMPONENT YARN

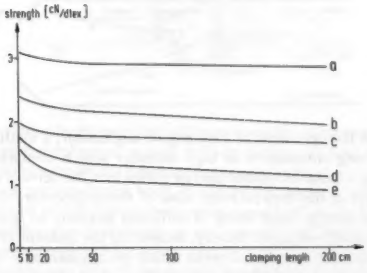
**Günther Bauer, Königsbrunn; Wolfgang Burghardt, Bobingen, and Hilmar Möller, Neusäss-Westheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Nov. 20, 1979, Ser. No. 95,977**

**Claims priority, application Fed. Rep. of Germany, Nov. 24, 1978, 2850853**

**Int. Cl.³ D02G *1/02, 3/24***

**U.S. Cl. 57—247** **5 Claims**




**1.** A voluminous, false twist texturized filament yarn having individual protruding filament ends which comprises the yarn being hairy and formed of filaments of a uniform polyester raw material,

the improvement which comprises said polyester raw material contains as a fiber forming polymer a modified polyethylene terephthalate having a relative viscosity of from 1.5 to 1.65 and modified with a branching or cross-linking agent,

said agent being in a stoichiometric ratio of the agent in the polyester raw material corresponding to the stoichiometric ratio of 0.3 to 0.8 weight % of trimethylolpropane in said raw material,

the tenacity of the filament yarn at a clamping length of 5 cm being below 1.7 cN/dtex but above 1.3 cN/dtex, the tenacity at a clamping length of 200 cm being less than 75% of the strength at a clamping length of 5 cm, at least however 0.8 cN/dtex, and the unevenness of the yarn being less than 3 Uster %,

the flex abrasion resistance of the filaments of said yarn being such that a web-like structure on processing of the yarn has low pilling.

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**4,302,930**

## SELF-THREADING YARN BRAKE MECHANISM

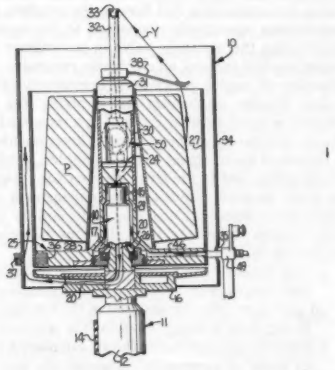
**Gustav Franzen, Willich, Fed. Rep. of Germany, assignor to Palitex Project Company GmbH, Fed. Rep. of Germany**

**Filed Feb. 21, 1980, Ser. No. 123,118**

**Claims priority, application Fed. Rep. of Germany, Feb. 22, 1979, 2906811**

**Int. Cl.³ D01H *13/10, 15/00, 7/86*; B65H *59/14***

**U.S. Cl. 57—279** **9 Claims**




**1.** A yarn brake constructed for insuring reliable positioning of a yarn for application of a braking force thereto when the yarn is threaded through the brake, said yarn brake comprising a tubular brake housing having axially spaced apart inlet and outlet openings for passage of a yarn therethrough and an enlarged cavity formed in said tubular housing between said inlet and outlet openings, a pair of cooperating brake platelets mounted in said enlarged cavity, said brake platelets having surface portions positioned in opposing resiliently biased contacting relation for applying a braking force to a yarn passing therebetween, and said brake platelets having peripheral portions cooperating with one another to form a V-shaped groove for guiding the yarn between said opposing contacting surface portions, and said yarn brake having an enclosed sided elongate yarn passageway extending within said cavity from said inlet opening to said outlet opening and past said pair of brake platelets for threading of a yarn through said brake housing, one side of said elongate yarn passageway comprising said peripheral portions of said brake platelets which form said V-shaped groove and the remaining sides being formed by said brake housing to define a lateral width for said passageway less

than the width of said peripheral portions whereby said V-shaped groove is positioned for receiving a yarn which is threaded through said passageway and reliably guiding the yarn between said brake platelets without the possibility of lateral deviation therefrom.

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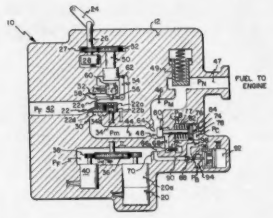
**4,302,931**

## FUEL FLOW LIMITING DEVICE FOR OVERSPEED AND OVERTEMPERATURE CONTROL

**Albert H. White, Wethersfield, and Raymond D. Zagranski, Newington, both of Conn., assignors to Cnandler Evans Inc., West Hartford, Conn.**

**Filed Jun. 16, 1980, Ser. No. 160,006**
**Int. Cl.³ F02C *9/32***
**U.S. Cl. 60—39.28 R** **4 Claims**




1. In a fuel control for a gas turbine engine of the type having: a housing with a main fuel supply conduit; a metering valve for controlling fuel flow in the conduit; a valve driving mechanism operatively connected to the metering valve for positioning the metering valve in accordance with a control signal applied thereto; an electronic computer, responsive to a plurality of engine parameters, operatively connected to the valve driving mechanism for applying the control signal thereto; a lever member for setting a requested speed; a transducer operatively connected to the lever member for directing a requested speed signal to the computer; a drive shaft operatively connected to the lever member for rotation in response to lever member displacements; engagement means to drivingly interconnect the metering valve and the drive shaft such that rotation of the drive shaft positions the metering valve; the improvement comprising:

a flow limiting valve mounted in the main fuel supply conduit downstream of the main fuel metering valve;

an actuation cylinder disposed in the housing and connected to the flow limiting valve for the positioning thereof;

a solenoid operated valve fluidly connected to the actuation cylinder to alternately communicate high and low fuel pressure in the housing for modulating the pressure therein; and

a solenoid control circuit adapted to sense engine overspeed and overtemperature error signals for applying pulses having a duty cycle commensurate with the magnitude of the error signals to the solenoid operated valve such that the actuation cylinder positions the flow limiting valve to restrict fuel flow.

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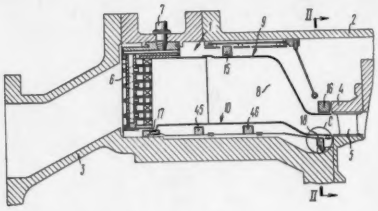
**4,302,932**

## ANNULAR COMBUSTOR OF GAS TURBINE ENGINE

**Andrei L. Kuznetsov, ulitsa S. Kovalevskoi, 16/4, kv. 141; Anatoly V. Sudarev, Georgievskaya ulitsa, 2, kv. 57; Viktor V. Ivakhnenko, Tovarischesky prospekt, 4, kv. 373; Jury A. Lamm, ulitsa S. Kovalevskoi, 16, kv. 79; Vladimir A. Maev, ulitsa Granitnaya, 36, kv. 46, and Jury I. Zakharov, ulitsa Butlerova, 24, kv. 40, all of Leningrad, U.S.S.R.**

**Filed Oct. 3, 1979, Ser. No. 81,369**
**Int. Cl.³ F02C *7/20***
**U.S. Cl. 60—39.32** **2 Claims**

1. An annular combustor of a gas turbine engine having a diffusor and a longitudinal split coinciding with a longitudinal split of the engine and comprising: a front burner device located in an inlet section of said annular combustor; a flame tube; an outer shell and an inner shell, both having curvilinear surfaces, concentric with each other, forming said flame tube and being split into sections in the longitudinal direction; sealing members adapted to seal the places of the split; at least two ring-shaped, longitudinally-split load-bearing members for each one of said outer and inner shells, one of said load-bearing members being located in the zone of said inlet section of said



combustor and having a provision for longitudinal and radial movements relative to said diffusor, while the other one of said load-bearing members is located in the zone of the outlet section of said combustor and having a provision for radial movement; each one of said longitudinal sections being coupled with a respective one of said ring-shaped, load-bearing members, such that the middle portion of each said section is attached to a ring-shaped member while the ends of said section are connected to the ring-shaped member with provision for movement in the circumferential direction.

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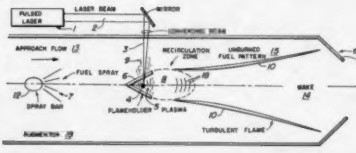
**4,302,933**

## JET ENGINE AUGMENTOR OPERATION AT HIGH ALTITUDES

**Marvin M. Smith, 1010 E. Parkway Dr., Muncie, Ind. 47304**

**Continuation-in-part of Ser. No. 16,625, Mar. 1, 1979, abandoned, which is a continuation-in-part of Ser. No. 840,491, Oct. 7, 1977, abandoned. This application Apr. 28, 1980, Ser. No. 144,634**
**Int. Cl.³ F02K *3/10***
**U.S. Cl. 60—261** **4 Claims**



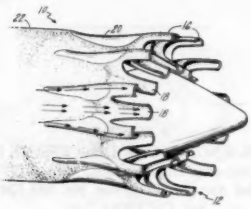

1. In the operation of a jet engine augmentor, a method for stabilizing combustion at high altitudes which comprises directing a beam of radiant energy pulses into the aerosol of fuel droplets in the recirculation zone of the augmentor, the said radiant energy beam being of sufficient intensity to ignite the fuel droplets engaged thereby, measuring the ambient pressure of the atmospheric envelope in which the augmentor is operating, and varying the frequency of the radiant energy pulses in direct relation with variations of the ambient atmospheric pressure, whereby the fuel-air ratio in the wake combustion is continuously maintained at a high thermal efficiency.

4,302,934

## LOBED MIXER/INVERTER

Thomas A. Wynosky, Madison; Donald C. Eiler, South Windsor, and Jerrold R. Blatt, Newington, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 1, 1979, Ser. No. 90,185
Int. Cl.[3] F02K 1/40
U.S. Cl. 60—262 3 Claims



1. A multi-lobed mixer for fan jet engine fabricated from a single generally cylindrically shaped member formed about an axially extending center line and having alternately circumferentially spaced radially inward and radially outward extending lobes on the aft end of said cylindrical member and forming chutes for directing fan and engine flow into mixing relationship, an annular depression formed intermediate the ends of said cylindrical member adjacent the flow entrance of said lobes, fairing means formed on the radially outward extending lobe bridging the depression and spanning the width of the attaching lobe and having its radial most extension portion extending substantially the same distance from said center line as the top portion of said radially outward extending lobe whereby a portion of the flow from the fan is directed substantially straight through over the top surface of said radially outward extending lobes.

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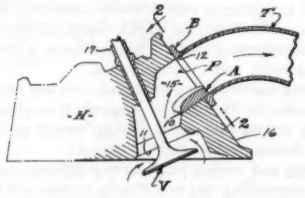
4,302,935

## ADJUSTABLE (D)-PORT INSERT HEADER FOR INTERNAL COMBUSTION ENGINES

Robert D. Cousimano, 8335 Lyndora St., Downey, Calif. 90242

Filed Jan. 31, 1980, Ser. No. 117,122
Int. Cl.[3] F01N 7/08; F02F 1/00
U.S. Cl. 60—272 10 Claims



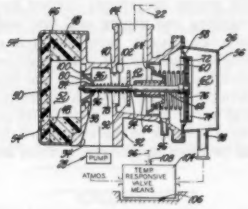
1. An individually adjustable D-port insert for securement to an internal combustion engine exhaust header without alteration of the exhaust port-passage in the engine head, and comprising; a wedge-shaped body to extend into and occupy one side portion of the exhaust port-passage and having an exterior substantially complementary to said one side of the exhaust port-passage and with a leading edge to lie substantially contiguous to said one side of the exhaust passage ahead of the exhaust port and interface engagement with the exhaust header to which the insert is fixedly mounted for extension through the exhaust port and into said exhaust passage.

4,302,936

## AUTOMOTIVE EXHAUST EMISSION SYSTEM

Dean F. Wheeler, Redford Township, Wayne County, Mich., assignor to Colt Industries Operating Corp, New York, N.Y.

Filed Jun. 12, 1978, Ser. No. 914,492
Int. Cl.[3] F02B 75/10
U.S. Cl. 60—290 2 Claims



1. The combination of an internal combustion engine having intake and exhaust manifolds, an air pump, means operatively connecting said air pump to said engine in order to drive said pump in relation to engine speed, conduit means for delivering air from said pump to said exhaust manifold, first means responsive to the attainment of a predetermined intake manifold vacuum during engine deceleration for preventing delivery of said air through said conduit means to said exhaust manifold during engine deceleration, second means including an opening to atmosphere for at times discharging substantially all of said air delivered by said pump during engine deceleration, said second means also being effective to relieve any excess air pressure generated by said pump at any time by venting said excess air pressure to atmosphere through said opening, and third means responsive to indicia of engine operating temperature for causing said first means to prevent delivery of said air through said conduit means at engine operating temperatures below a predetermined magnitude, said conduit means comprising first and second conduit portions and first passage means interconnecting said first and second conduit portions, said first conduit portion being situated upstream of said first passage means and said second conduit portion, said first means comprising a first valve seat generally circumscribing said first passage means, a first valve member for cooperating with said valve seat for opening and closing said first passage means in order to thereby respectively complete and terminate communication as between said first and second conduit portions, pressure responsive movable diaphragm means, stem means operatively connected to said diaphragm means and operatively carrying said first valve member, said opening comprising second passage means communicating between said first conduit portion and atmosphere, said second means comprising a second valve seat generally circumscribing said second passage means, a second valve member for cooperating with said second valve seat for opening and closing said second passage means in order to thereby respectively complete and terminate communication as between said first conduit portion and atmosphere, said second valve member being operatively carried by said stem means as to be spaced from said first valve member, said second valve member being of cup-like configuration having an axial end wall and an integrally formed circumferentially continuous side wall extending both axially and radially away from said end wall and terminating in a circumferentially continuous radially extending flange portion, said flange portion being effective to seat against said second valve seat when said second valve member is in a position closing said second passage means, said axial end wall comprising aperture means for accommodating the passage therethrough of said stem means, said second valve member being so positioned on said stem means as to have said circumferentially continuous side wall generally received in and confined by said second passage means when said flange portion is seated against said second valve seat, first resilient means operatively

connected to said pressure responsive movable diaphragm means and effective for urging said first valve member in a direction away from said first valve seat and effective for urging said second valve member in a direction toward said second valve seat, said aperture means being of a size as to enable said second valve member to move axially relative to said stem and to experience angular deflection relative to the axis of said stem, a retainer member carried by said stem, and second resilient means operatively carried by said stem and operatively engaging and urging said first and second valve members in directions axially along said stem and away from each other whereby said second valve member is resiliently urged into operative engagement with said retainer member, said angular deflection enabled by said aperture means permitting said second valve member to angularly deflect with respect to said stem in order to thereby assure optimum seating engagement as between said flange portion and said second valve seat.

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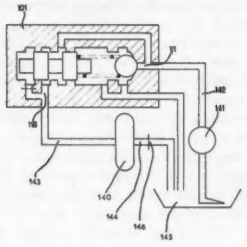
**4,302,937**

## PRESSURE LIMITER-REGULATOR

**Paul Aubert, Clamart, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt, France**

**Filed Sep. 28, 1979, Ser. No. 79,737**
**Claims priority, application France, Sep. 29, 1978, 78 27976**
**Int. Cl.[3] F16D *33/00*; G05D *11/02, 16/00***
**U.S. Cl. 60—330** **7 Claims**



7. A hydraulic control circuit, comprising:

a fluid reservoir,

a fluid pump pumping fluid from said reservoir,

a body having a fluid inlet duct connected to said fluid pump, a fluid outlet duct, a return-to-reservoir duct connected to said reservoir, and first, second and third chambers serially arranged along a central passageway, said inlet duct being connected in parallel to said first and second chambers, said outlet duct being connected in parallel to said second and third chambers, and said return-to-reservoir duct being connected only to said first chamber,

a torque converter connected to said outlet duct and connected through a restricting orifice to said reservoir,

pressure regulating means in said body for regulating the outlet pressure of the fluid, so that said torque converter is provided with fluid at a constant pressure, and including a sliding member in said central passageway having a first end subjected to the pressure of the fluid in said third chamber, which is the pressure of the fluid in the outlet duct, and having a second end, said sliding member throttling the fluid passage into said second chamber from said inlet duct and from said second chamber into said outlet duct,

pressure limiting means in said first chamber for limiting the inlet pressure applied to said pressure regulating means to a predetermined maximum having a seat at one end of said central passageway where said inlet duct enters said first chamber and a sealing member in said central passageway for moving against said seat and normally closing said first chamber off from said inlet duct, until a predetermined maximum fluid pressure in said inlet duct moves said sealing member off said seat and connects said inlet duct, through said first chamber, to said return-to-reservoir duct, and

a single resilient means between and acting on both said second end of said sliding member and said sealing member.

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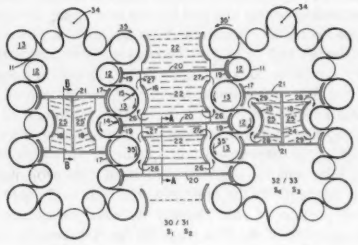
**4,302,938**

## NITINOL ENGINE FOR LOW GRADE HEAT

**Yao T. Li, Huckleberry Hill, Lincoln, Mass. 01773**

**Filed Aug. 14, 1978, Ser. No. 933,528**
**Int. Cl.[3] F03G *7/06***
**U.S. Cl. 60—527** **7 Claims**



1. A thermal engine for converting a portion of the energy available between two heat sources with a temperature gradient between them comprising:

a continuous band of material having a shape memory triggerable by an upper transition temperature and a lower transition temperature, said two transition temperatures being within the temperature gradient of the two heat sources,

said band being capable of receiving heat from the warmer source and discharging heat to the cooler source,

guiding means for guiding the band to permit continuous revolution,

means for imparting to each of plural sections of the band a sequence of at least four cycles, including sequentially a shape transforming cycle, a thermal cycle, a shape transforming cycle, and a thermal cycle,

said guiding means serving to provide first and second positive guides for the band to constrain it to glide along a heating curved path and a cooling curved path, respectively, during the two thermal cycles,

said heating and cooling paths having different curvatures,

means incorporating said heat sources to raise and lower the temperature of the band above and below the respective transition temperatures during said thermal cycles,

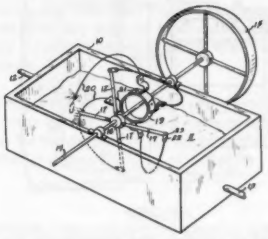
means to constrain the band to glide and to change from one of the said curvatures to the other to accomplish the shape transforming cycle of the band, each said curvature changing guide constituting a shape transforming station, said shape transforming of the curvature of the band in going through the guided path of changing curvature providing an input or output of mechanical power, and

means coupling the revolving band with output means to sum together the mechanical power occurring at each shape transforming station along the band to provide net output power.

## 4,302,939
## SOLID STATE ENGINE USING NITINOL MEMORY ALLOY

**Ahmad A. Golestaneh, Bolingbrook, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Jan. 21, 1980, Ser. No. 114,134**
**Int. Cl.³ F03G 7/06**
**U.S. Cl. 60—527** **17 Claims**

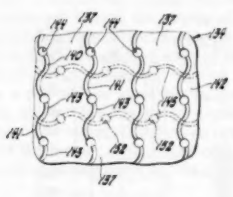


1. A device for converting heat energy to mechanical energy comprising:
- a reservoir of fluid and
- a rotor assembly including
- a shaft,
- a floating ring encircling the shaft and
- a plurality of arcuate flexible elements composed of a shape-memory material having a critical temperature below that of the fluid temperature connecting the shaft and the floating ring disposed symmetrically about the rotor assembly so as to dip into the water on rotation of the rotor assembly,
- whereby energetic shape recovery of the thermal memory material in the reservoir displaces the center of mass of the rotor assembly to one side of the axis of rotation thereof so that the force of gravity acting on the floating ring causes the rotor assembly to turn and simultaneously deforms those arcuate elements in the atmosphere, readying them for further energetic shape recovery upon further rotation into the reservoir.

## 4,302,940
## PATTERNED POROUS LAMINATED MATERIAL

**George B. Meginnis, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 13, 1979, Ser. No. 48,132**
**Int. Cl.³ F02C 7/18**
**U.S. Cl. 60—754** **5 Claims**

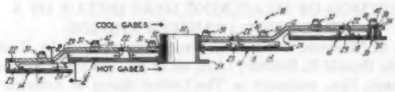


1. A porous laminated material for use in an air cooled gas turbine engine component comprising a first sheet and a second sheet, means for defining a plurality of continuously formed serpentine grooves between said first and second sheets, a plurality of holes directed through each of said first and second sheets having a portion thereof in intersecting relationship with said serpentine grooves, each of said first and second sheets having a land portion thereon intermediate said grooves, means for bonding said land portions together, said serpentine grooves having a crossing pattern to form a cross-over passage between said grooves, said holes in one of said sheets serving to direct coolant into said serpentine grooves for flow therethrough to said crossover passages and for return flow through said serpentine grooves for flow from the holes in the other of said sheets for cooling the laminated material by transpiration cooling, each of said serpentine grooves having a bend formed therein between each of adjacent ones of the holes which intersect individual ones of said serpentine grooves producing relief between said first and second sheets to prevent excessive surface distortion and stretch marks across a sheet of the laminated material as it is tensioned during formation thereof so as to prevent tears in the surface thereof thereby to maintain a uniform flow of coolant therethrough.

## 4,302,941
## COMBUSTER LINER CONSTRUCTION FOR GAS TURBINE ENGINE

**Thomas L. DuBell, Lake Park, Fla., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Apr. 2, 1980, Ser. No. 136,631**
**Int. Cl.³ F23R 3/44, 3/60**
**U.S. Cl. 60—757** **9 Claims**

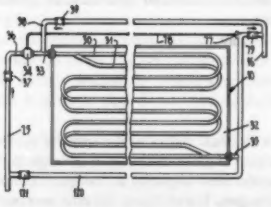



1. A combustor liner for a gas turbine engine which has a compressor, said liner comprising an outer liner wall generally configured in a cylindrical shape defining a combustion zone, axially spaced concentrically disposed segmented ring elements having longitudinal projecting fingers extending toward but short of said outer liner wall defining an inner wall relative to said combustion zone, said fingers defining open ended longitudinal passages circumscribing said outer wall, an inlet for leading cooling air from said compressor intermediate the ends of said longitudinal passages so that a portion flows counter to and the remainder flows parallel to the flow of the combustion products, means for floating the inner wall so that it moves concentrically relative to said outer wall to minimize thermal stresses ocassioned during the firing of the combustor, said means includes attachment means extending from said inner wall through said outer wall.

## 4,302,942
## SOLAR BOOSTED HEAT PUMP

**William W. S. Charters, Lower Templestowe, and Leonard E. Taylor, Mt. Clear, both of Australia, assignors to The University of Melbourne, Parkville, Australia**

**Filed Jul. 21, 1978, Ser. No. 926,967**
**Int. Cl.³ F25B 27/00; F24J 3/02**
**U.S. Cl. 62—235.1** **14 Claims**



1. A solar boosted heat pump for providing heating or cooling for domestic and other purposes, comprising:

a heat conducting plate having a front surface which in operation is exposed to the sun and atmosphere, said plate having an uninsulated rear surface which in operation is exposed to the atmosphere, and said plate having at least one refrigerant fluid carrying plate tube in heat transfer relationship therewith;

a closed refrigerant flow system, said tube forming part of said closed refrigerant flow system and having an inlet and an outlet;

said plate operating as a direct solar and ambient heat absorber when the pump is in its heating mode and as a radiator when the pump is in its cooling mode; and,

said refrigerant flow system also including a compressor and a heat exchanger in heat exchange relationship with a heat transfer medium; said plate includes sensing means for varying the speed and/or displacement of said compressor depending on the light incident onto or energy on said plate.

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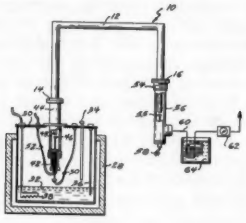
**4,302,943**

## METHOD OF MEASURING HEAT INFLUX OF A CRYOGENIC TRANSFER SYSTEM

**Ralph C. Niemann, Downers Grove; Steven A. Zelipsky, Tinley Park; Ronald R. Rezmer, Lisle, all of Ill., and Peter Smelser, Bruner, Mo., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Oct. 29, 1980, Ser. No. 201,947**
**Int. Cl.³ F17C *13/02***
**U.S. Cl. 62—49** **9 Claims**



1. A method for measuring the heat influx of a cryogenic transfer system comprising the steps of:

establishing a flow of gaseous cryogen through said transfer system;

measuring the temperature of said gaseous cryogen at an inlet and an outlet of said transfer system;

measuring the mass flow rate of said gaseous cryogen;

calculating the heat capacity of said gaseous cryogen; and

calculating the heat influx of said transfer system by using the equation

$$Q = \dot{m} \int_{T_i}^{T_o} C_p \, dT,$$

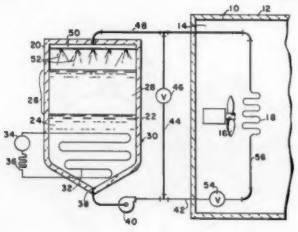
where Q is the heat influx to the transfer system, m is the mass flow rate of gaseous cryogen through the system, $C_p$ is the specific heat capacity at constant pressure of the gaseous cryogen, $T_i$ and $T_o$ are the inlet and outlet temperatures of the transfer system, respectively, and dT is the temperature differential along the transfer system.

**4,302,944**

## THERMAL STORAGE METHOD AND APPARATUS

**Gordon C. Gainer, Penn Hills Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jul. 15, 1980, Ser. No. 169,055**
**Int. Cl.³ F25D *3/00, 17/02, 11/00***
**U.S. Cl. 62—59** **13 Claims**



1. The method of creating low temperature ice and then using the latent heat of fusion of the ice for cooling, comprising the steps of:

chilling a high density first fluid which has communication with a lower space in an insulated container;

circulating said chilled first fluid in a first circuit to the surface of a second fluid, said second fluid comprising an anti-freeze solution of lower density than said first fluid and immiscible therein, and occupying a higher space in said container by virtue of its lower density;

continuing said chilling and circulating steps, with said first fluid settling downwardly through said second fluid until the temperature of said second fluid has decreased sufficiently that an adequate quantity of slush ice of a desired low temperature is formed in said second fluid; and then

circulating said first fluid to a space to be cooled to pick up heat therefrom and returning the warmed first fluid to the surface of said second fluid containing the ice slush, so that said first fluid will be chilled by said ice slush in percolating downwardly therethrough

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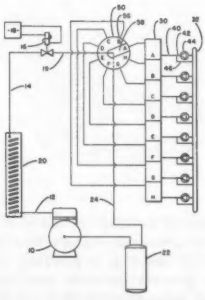
**4,302,945**

## METHOD FOR DEFROSTING A REFRIGERATION SYSTEM

**William W. Bell, Marcellus, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.**

**Division of Ser. No. 75,438, Sep. 13, 1979, Pat. No. 4,262,496. This application Oct. 2, 1980, Ser. No. 192,968**
**Int. Cl.³ F25B *41/00***
**U.S. Cl. 62—81** **2 Claims**



1. A method of operating a refrigeration system having a

heat exchanger upon which frost may accumulate which comprises the steps of:

compressing gaseous refrigerant to increase the temperature and pressure of the refrigerant

condensing said refrigerant to a liquid to reject the heat of condensation

dividing the heat exchanger into a plurality of zones, each zone acting as a separate heat transfer unit

subcooling the liquid refrigerant in at least one zone of the heat exchanger such that heat energy is rejected from the refrigerant to melt the frost accumulated on that zone of the heat exchanger

evaporating the subcooled liquid refrigerant in the remaining zones of the outdoor heat exchanger to absorb heat energy from the ambient air in heat exchange relation therewith,

and

cycling the steps of subcooling and evaporating such that each zone of the evaporator periodically acts as a subcooler for the purpose of melting the frost accumulated on the heat exchange surfaces of that zone.

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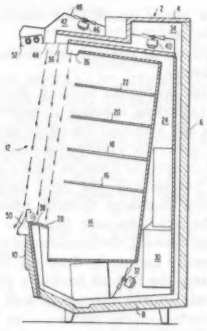
**4,302,946**

## REFRIGERATION SYSTEM USING AIR DEFROST

**Fayez F. Ibrahim, Niles, Mich., assignor to Tyler Refrigeration Corporation, Niles, Mich.**

**Filed Feb. 2, 1979, Ser. No. 8,927**
**Int. Cl.[3] F25D *21/12***
**U.S. Cl. 62—82** **34 Claims**



1. A method for selectively refrigerating and defrosting a refrigeration system including a cabinet having: top, bottom and side walls and an opening in one of the walls for enabling access to products displayed within the cabinet; a first air conduit extending around the cabinet and having an air outlet and an air inlet at respective opposing ends of the opening in the cabinet; a refrigeration mechanism arranged within the first air conduit; and a second air conduit extending around the cabinet and positioned toward the outside of the cabinet with respect to the first air conduit and having an air outlet and an air inlet at the respective opposing ends of the opening in the cabinet; the method comprising the steps of:

establishing a primary air band in the first air conduit by circulating air through the first air conduit and directing air leaving the air outlet of the first air conduit towards the air inlet of the first air conduit and refrigerating such air during a refrigeration cycle by the refrigerating mechanism;

establishing a secondary air band in the second air conduit during a refrigeration cycle by circulating air through the second air conduit and directing air leaving the air outlet of the second air conduit towards the air inlet of the second air conduit;

temporarily terminating the active circulation of air through the second air conduit during a defrost cycle; and

increasing the quantity of air flowing through the first air conduit during the defrost cycle and simultaneously turning off the refrigerating mechanism whereby ambient air is drawn into the first air conduit and such air acts to defrost any frost buildup within the first air conduit during the defrost cycle.

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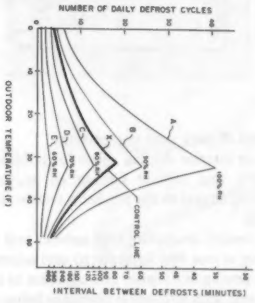
**4,302,947**

## HEAT PUMP SYSTEM DEFROST CONTROL

**Dale A. Mueller, St. Paul, and Stephen L. Serber, New Hope, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Jan. 4, 1980, Ser. No. 109,742**
**Int. Cl.[3] F25D *21/06***
**U.S. Cl. 62—155** **4 Claims**




1. An outdoor coil defrost control system (hereinafter "defrost control system") for a reverse cycle refrigeration system (hereinafter "system") for heating and cooling a building wherein said system comprises refrigerant compression means, an indoor coil, an outdoor coil, and refrigerant conduit means connecting said compression means and said coils, said defrost control system comprising:

outdoor coil temperature sensing means (hereinafter "TODCS") having an output indicative of the temperature of said outdoor coil (hereinafter "TODC");

means (hereinafter "COM") operatively associated with said compression means and adapted to have an output indicative of the operation of said compression means; and

controller means having operative connections to said TODC and COM so as to receive the outputs thereof, said controller having a timing function which is initiated upon (i) the outdoor coil temperature as sensed by TODC being at or below a preselected value and (ii) said compression means being operated,

the duration of said timing function being determined on a substantially continuous basis by the magnitude of the outdoor coil temperature as sensed by TODCS, and the duration of the timing function of said controller means being further determined by a succession of calculations of points (based on instantaneous value of TODC), and the addition of each such calculation of the preceding total, such calculations continuing until the total of points is greater than a preselected number of points, and

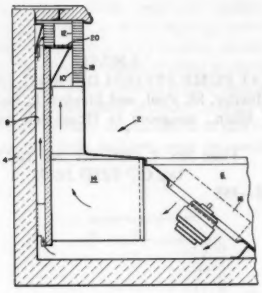
said controller means having an operative connection to said system and including means responsive to said point total exceeding said predetermined number and thereupon effective to place said system into an outdoor coil defrost mode of operation.

4,302,948

## REFRIGERATED DISPLAY CASE HAVING A UNITARY OUTLET GRID

Fayez F. Ibrahim, Niles; Elmer Subera, Cassopolis, both of Mich., and William deBruyn, South Bend, Ind., assignors to Tyler Refrigeration Corporation, Niles, Mich.

Filed Sep. 6, 1979, Ser. No. 73,247
Int. Cl.[3] A47F 3/04
U.S. Cl. 62—256 8 Claims



1. A refrigerated display case comprising:

a cabinet with an interior display space for holding refrigerated products, said cabinet having an access opening therein enabling access to the products within said interior display space;

a primary air conduit encircling said cabinet and having an outlet opening at one end adjacent to said access opening and an inlet opening at its other end adjacent to said access opening and said inlet and outlet openings being aligned so that air leaving said outlet opening is directed across said access opening of said cabinet and received by said inlet opening;

refrigeration means arranged in said primary air conduit for refrigerating air passing through said primary air conduit;

means for circulating air through said primary air conduit;

a secondary air conduit extending along said cabinet and positioned outside of said primary air conduit, said secondary air conduit having an outlet opening for directing air across said access opening of said cabinet and said outlet opening of said secondary air conduit being aligned with and positioned adjacent to said outlet opening of said primary air conduit;

a unitary grid member extending across said outlet opening of said primary air conduit and said outlet opening of said secondary air conduit, said grid member having a plurality of parallel air outlet channels; and,

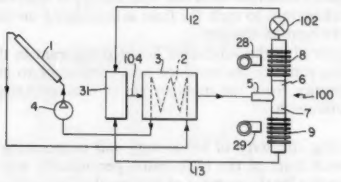
thermal insulating means for separating said outlet opening of said primary air conduit and said outlet opening of said secondary air conduit and contacting said unitary grid for thermally isolating said outlet openings for minimizing condensation in the area of the intersection of said outlet opening of said primary air conduit and said outlet opening of said secondary air conduit due to the differential in the temperature of the air emitted from said outlet openings, said insulating means serving to sufficiently minimize condensation for avoiding frost build-up free of the application of heat supplied by using electrical heater wires, said insulating means including an insulating member formed by a sheet metal plate covered on both sides with an insulating material such as a flexible rubber based insulation with the thickness of said insulating material being approximately between ⅛" and ¼" on each side of said metal plate.

4,302,949

## REFRIGERATION AND HEATING SYSTEM

Antonio A. Trimboli Longhetto, Madrid, Spain, assignor to Victor M. Oswald, Madrid, Spain

Filed Dec. 21, 1979, Ser. No. 105,934
Int. Cl.[3] F25D 9/00
U.S. Cl. 62—402 11 Claims




1. A turbine assembly for dividing an input stream of gas into a first and a second output stream of gas, the first output stream having a higher temperature than the second output stream, the turbine assembly comprising:

(a) a generally gas-tight housing having:

(a.1) an inlet conduit for directing a high-velocity stream of gas constituting the input stream into the interior of the housing, the inlet conduit having an inlet discharge opening through which the input stream can flow into the interior;

(a.2) a hot-flow outlet opening for discharging the first output stream; and

(a.3) a cold-flow outlet opening for discharging the second output stream;

(b) a turbine located within the housing, the turbine having a passageway extending through it between a first discharge opening and a second discharge opening, the passageway being generally axially-symmetric in shape and having a throat defined by a region with a smallest diameter within the passageway, the axial distance from the throat to the first discharge opening being significantly greater than the axial distance from the throat to the second discharge opening, the diameter of the passageway increasing generally uniformly from the throat to either discharge opening, the turbine having a plurality of gas-injection channels passing through a wall of the turbine from an outer surface of the turbine to an inner passageway surface defining the passageway, the intersection of the gas-injection channels with the passageway surface defining a plurality of gas-injection ports for introducing gas into the passageway, the gas-injection ports being located in the vicinity of the throat of the passageway and spaced apart azimuthally about the passageway, each gas-injection channel defining a gas-injection direction by the direction of approach of the gas-injection channel to the corresponding gas-injection port, the gas-injection directions being oriented generally symmetrically with respect to a normal plane perpendicular to the axis of the passageway and passing through the throat, directed tangents to the passgeway surface being defined at each gas-injection port, the directed tangents extending parallel to the normal plane and being oriented to define collectively a direction of circulation in the passageway of the turbine, each gas-injection channel defining an interception angle between the gas-injection direction and the directed tangent defined at the gas-injection port, the interception angles being acute angles so that gas injected into the passageway of the turbine through the gas-injection channel tends to flow in a vortical pattern, each gas-injection channel being enlarged in an inner transverse dimension to define an end chamber at the end of the channel which intercepts the outer surface, the intersection of each end chamber with the outer surface of the turbine defining an end-chamber port for receiving gas to

flow through the gas-injection channel, the end-chamber ports being spaced apart azimuthally about the outer surface in the vicinity of the normal plane; and

(c) attachment means for mounting the turbine within the housing, the turbine being positioned so that the throat of the turbine communicates with the hot-flow outlet opening of the housing through the first discharge opening of the turbine, and communicates with the cold-flow outlet opening of the housing through the second discharge opening of the turbine, the inlet conduit of the housing defining an inlet injection direction by the direction of approach of the inlet conduit to the inlet discharge opening, the inlet-injection direction being oriented so that a line extending along the inlet-injection direction at least approximately lies in the normal plane of the turbine and is offset a significant distance from the axis of the passageway, the direction of the offset being such that a gas flow along the inlet-injection direction tends to reinforce a vortical flow pattern circulating in the sense defined by the directed tangents associated with the gas-injection ports of the turbine, an outer surface of the turbine through which the end-chamber ports pass being spaced apart from an inner surface of the housing to define a gas distribution duct, the gas-distribution duct communicating with the hot-flow outlet opening through a first turbine-bypass opening and with the cold-flow outlet opening through a second turbine-bypass opening, the gas-distribution duct thereby providing communication between the inlet discharge opening of the inlet conduit and the end-chamber ports of the turbine and the hot and cold flow openings of the housing.

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**4,302,950**

## DEVICE FOR METALLIC MIRROR-CRYOFIXATION AND SUBSEQUENT CRYOPREPARATION OF BIOLOGICAL MATERIALS

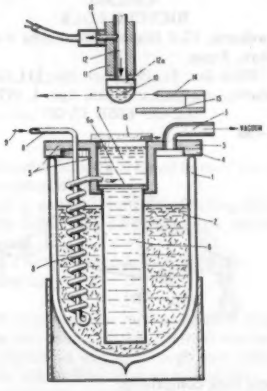
**Hellmuth Sitte, Seefeld, Austria, assignor to C. Reichert Optische Werke, AG, Vienna, Austria**

**Filed Sep. 9, 1980, Ser. No. 185,631**

**Claims priority, application Fed. Rep. of Germany, Nov. 6, 1979, 2944806**

**Int. Cl.³ F25B *19/00***

**U.S. Cl. 62—514 R** **5 Claims**



1. In a device for metallic mirror-cryofixation and subsequent cryopreparation of biological materials for microscopic, in particular electron microscopic, examinations having a freezing chamber, first cooling means for cooling said chamber with a first cryogen and a mirror surface mounted in said chamber for rapidly cooling a specimen placed in contact with said surface, the improvement comprising thermal insulation means to thermally isolate a portion of said mirror surface from the remainder of said mirror surface, cover means to form a small chamber in cooperation with said portion of said mirror surface, second cooling means for cooling said portion of said mirror surface with a second cryogen and the second cryogen having a lower liquid temperature than said first cryogen.

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**4,302,951**

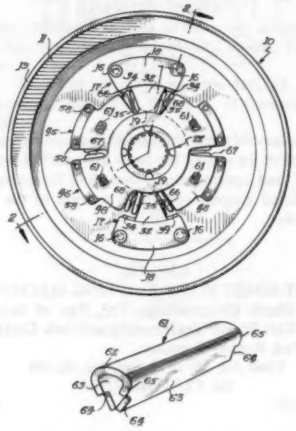
## TORSIONAL VIBRATION DAMPER

**Don R. Fall, Oxford, and Paul E. Lamarche, Utica, both of Mich., assignors to Borg-Warner Corporation, Chicago, Ill.**

**Filed Dec. 26, 1979, Ser. No. 106,593**

**Int. Cl.³ F16D *3/14***

**U.S. Cl. 64—27 C** **10 Claims**



1. A torsional vibration damper assembly to transmit torque between driving and driven members, comprising an input member operatively associated with torque input means, a hub assembly operatively connected to torque output means and having a pair of oppositely extending radial arms, at least one floating equalizer journalled on said hub assembly, damper springs interposed between said hub arms and said equalizer, a pair of drive tangs secured to said input member and having inwardly extending projections extending into the path of and engaging said damper springs, each hub arm having a circumferentially extending slot therein receiving said drive tang projection, said equalizer providing substantially enclosed pockets for said damper springs and having axially aligned pairs of elongated windows therein, and a spring divider extending between and projecting into said axially aligned pairs of windows to separate adjacent damper springs, said windows allowing limited arcuate movement of said dividers in said equalizer.

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**4,302,952**

## JACQUARD MECHANISM FOR KNITTING MACHINES

**Rose Wolfgang, Karl Marx Stadt, German Democratic Rep., assignor to VEB Kombinat Textima, Karl Marx Stadt, German Democratic Rep.**

**Filed Nov. 15, 1979, Ser. No. 94,868**

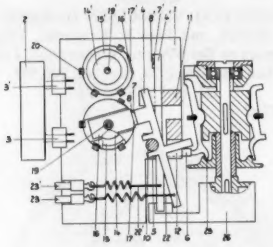
**Claims priority, application German Democratic Rep., Nov. 29, 1978, 209380**

**Int. Cl.³ D04B *7/00***

**U.S. Cl. 66—75.2** **12 Claims**

1. A jacquard mechanism comprising, in combination, a row of jacks and means mounting the jacks for movement between a first position and a second position, a row of magnet units, one for each jack, each magnet unit comprising a permanent magnet, a pole shoe structure, and a coil, the permanent magnet being operative for holding the respective jack in first

position against the respective pole shoe structure, the coil when energized with current of a predetermined polarity generating a field opposing the holding force exerted upon the jack by the permanent magnet, a mounting bar, the row of magnet units being all identical and thereby interchangeable



and being removably mounted on the mounting bar, biasing means operative for urging the jacks towards the second position thereof, and control means operative for energizing the coils of selected magnet units with current of the predetermined polarity.

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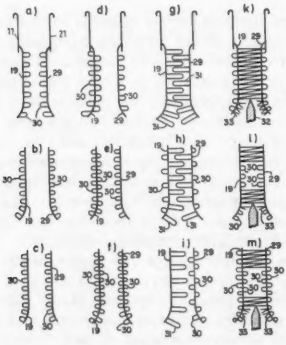
**4,302,953**

## RIGHT-RIGHT WARP KNITTING MACHINES

**Christian Wilkens, Heusenstamm, Fed. Rep. of Germany, assignor to Karl Mayer Textilmaschinenfabrik GmbH, Obertshausen, Fed. Rep. of Germany**

**Filed Jul. 25, 1979, Ser. No. 60,740**
**Int. Cl.³ D04B *23/02***
**U.S. Cl. 66—87** **10 Claims**



**1**. A process for manufacturing textured ware, such as pile fabrics, velour fabrics and combinations thereof, or the like on a warp knitting machine having first and second needle beds with a plurality of needles requiring external closing means disposed thereon, for producing a fabric panel on each said needle bed, first and second closing means adapted to cooperate with said needles for opening and closing said needles in a predetermined time sequence, and two first and two second guides for laying thread about said needles in said first and said second needle beds, respectively, comprising the steps of:

(a) simultaneously laying a first thread about a first needle in said first and second needle beds by said first guides each working cycle for the formation of a stitch; and

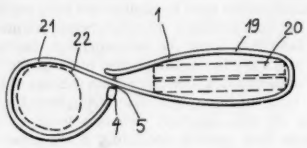
(b) periodically skipping the laying of a second thread about a second adjacent needle in said first and second needle bed by said second guides during said working cycle the laying of said first and second threads occuring in a predetermined time sequence.

**4,302,954**

## LOCK AGAINST THEFT FOR SKIS

**Peter Zisterer, Schubertstr. 14, D-7209 Gosheim, Fed. Rep. of Germany**

**Filed Feb. 5, 1980, Ser. No. 118,708**
**Claims priority, application Fed. Rep. of Germany, May 10, 1979, 7913531[U]**
**Int. Cl.³ E05B *67/06, 73/00***
**U.S. Cl. 70—18** **9 Claims**



**1**. A ski lock for locking of skis against theft to a stationary object, for example on a car ski holder, a post or the like, comprising a bendable longitudinal member, which has two locking areas longitudinally spaced from one another by a distance exceeding the perimeter of a ski or a pair of skis, which locking area can be connected fixedly to one another for forming a closed loop through a lock mounted on the longitudinal member, wherein said bendable longitudinal member is a bendable locking member to which a lock is allotted to which the one end of the locking member is secured permanently and in which the free end of the bendable locking member can be selectively locked, said bendable locking member having at least one through-receiving means at a distance from its free end, which distance is set to accommodate the perimeter of a ski or a pair of skis, the free end of the bendable locking member being introduceable through said receiving means into the lock to impart to the bendable locking member the shape of a double loop, said receiving means being constructed as a coupling member which is mounted fixedly on the bendable locking member, which in turn passes through said coupling member.

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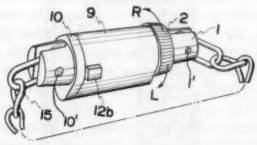
**4,302,955**

## BICYCLE LOCK

**Shigeru Kawakami, 17-3 Higashi Shinkoiwa 6-chome, Katsushika, Tokyo, Japan**

**Filed Jan. 11, 1980, Ser. No. 111,334**
**Claims priority, application Japan, Apr. 4, 1979, 54-39686**
**Int. Cl.³ E05B *37/08***
**U.S. Cl. 70—30** **1 Claim**



**1**. A bicycle lock comprising:

a casing having a hole;

a retainer mounted adjacent said casing, said retainer having a one end portion projecting into said hole of said casing;

a shaft unrotatably supported in said hole of said casing;

a knob slidably mounted adjacent to the one end of said shaft;

at least one pair of step wheels slidably mounted on said shaft, each of said at least one pair of step wheels having a recess in its periphery, a reduced diameter cylindrical lateral flange adjacent said recess in its periphery, and a

plurality of axial recesses formed in the face of said reduced diameter cylindrical lateral flange;

a retaining wheel slidably mounted on said shaft, said retaining wheel having a projection on one side engaging at least one of said plurality of axial recesses in one of said at least one pair of step wheels;

a clip disposed within said casing for preventing accidental movements of said at least one pair of step wheels, said clip having at least one clip member in frictional peripheral engagement with said lateral flange of the other of said at least one pair of step wheels;

a retainer slidably mounted adjacent to said retaining wheel, said retainer having a pair of laterally extending end portions, one of said pair of laterally extending end portions further engaging at least one of said plurality of axial recesses in said retaining wheel while the other of said pair of laterally extending end portions further projects outward from said hole in said casing;

a locking bolt inserted in said casing, said locking bolt having a plurality of notches corresponding with said peripheral recesses in said at least one pair of step wheels and a cap at one end;

a length of chain having one end connected to said cap and an opposite end connected to said knob; and

means for transmitting the rotation of said knob to each of said pair of step wheels, said transmitting means further comprising:

a lateral projection on at least one side of each of said pair of step wheels, each of said lateral projections on one of said step wheels further being engageable with said lateral projection on one side of the other of said pair of step wheels.

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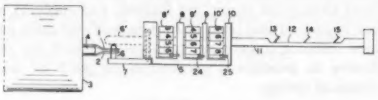
**4,302,956**

## BLOOD IDENTIFICATION MEANS

**John J. McMorrow, 55 Florence Ave., Oyster Bay, N.Y. 11771; Harold Kaplan, 37 Oakland Beach Ave., Rye, N.Y. 10580, and Frederick Sommerhalter, Jr., 98 Kellog St., Oyster Bay, N.Y. 11771**

**Filed Jul. 25, 1979, Ser. No. 60,641**
**Int. Cl.³ E05B *37/02***
**U.S. Cl. 70—312** **1 Claim**



1. Means for coded locking of blood bags of the type having a locking part, comprising:

a pin adapted to extend through the locking flap,

a numerically coded lock adapted to lock said pin through said flaps and

means to set a numerical code into said lock,

the lock comprising,

a casing,

a plurality of numbered disc means rotatably mounted in the casing. the disc means having a central notched shaftway,

a plunger adapted to extend through said casing and said disc means into locking relation to said pin,

a plurality of retarding elements mounted on said plunger whereby the plunger can be withdrawn only if the correct code is set on the numbered disc means,

the number disc means comprising,

an outer numbered disc,

an inner disc numbered and notched around its periphery, the inner disc having a central shaftway with a notch sized to pass the retarding members on said plunger, and

an outer disc having an indexing pin so that the inner and outer discs may be indexed together,

the casing having a plurality of partitions to receive the inner and outer discs in indexed position,

wherein the partitions each having a retaining pin and the outer disc has a circular retainer slot to engage the retaining pin so that the inner and outer discs might be rotated out of the casing for the purpose of indexing the inner and outer discs with respect to each other.

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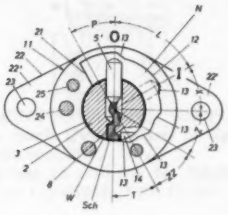
**4,302,957**

## LOCK CYLINDER

**Heinz Wolter, Kürten, Fed. Rep. of Germany, assignor to Dom-Sicherheitstechnik GmbH & Co. KG, Brühl, Fed. Rep. of Germany**

**Filed Dec. 21, 1979, Ser. No. 106,315**
**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1978, 2856006**
**Int. Cl.³ E05B *35/08***
**U.S. Cl. 70—337** **9 Claims**



1. A lock cylinder, comprising

a cylinder housing formed with bores and with rotation angle limit abutment means,

a row of housing tumbler pins disposed in said bores of the housing,

a rotatable cylinder core is rotatably disposed in said cylinder housing,

said cylinder core defining a key channel, said abutment means for limiting the rotation of said cylinder core in said housing defining fixed abutment positions, said cylinder housing defines a key insertion-side face and a rear face therebehind in an axial direction of said cylinder core, said cylinder core projects beyond said rear face of said cylinder housing forming a rearwardly projecting end of said cylinder core,

tumbler core pins disposed in said cylinder core and which operatively are coordinated to said housing tumbler pins,

only one abutment core pin is disposed in said rearwardly projecting end of said cylinder core and controllable by one of a plurality of keys, respectively, inserted in the key channel, said keys are formed with different depth notches, respectively, cooperating with said abutment core pin,

said core pin constituting means for providing various rotation angle limit abutments for the cylinder core,

a housing-sided slot means forming a single slot for receiving said core pin therein, said slot means has a base surface and is open in the direction of the core, said base surface of said slot means comprises a plurality of partial sections which are arranged at different radial distances relative to said cylinder core, each of said

partial sections respectively being off-set and connected via steps with respect to each other and each of said steps cooperates with said core pin selectively depending on said one key formed with one of said different depth notches, respectively.

4,302,958

## MAKING RINGS FROM TUBE STOCK

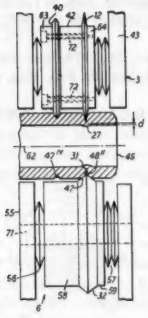
Ronald C. Andriessen, and Peter J. Holt, both of Cheltenham, England, assignors to Formflo Limited, Cheltenham, England

Filed Dec. 26, 1979, Ser. No. 107,369

Claims priority, application United Kingdom, Dec. 27, 1978, 50043/78

Int. Cl.³ B23B *1/00, 5/16*

U.S. Cl. 72—71 16 Claims



1. A method for in succession making rings from tube stock, including the steps of:

(i) supporting the tube stock on a central axis and effecting relative rotation about the central axis as between the tube stock and a part-off type rolling tool capable of limited, controllable axial movement, whilst

(ii) advancing the rolling tool in a generally radial direction into the tube stock to form a circumferential parting groove to a depth approximately equal to the required wall thickness of the ring;

(iii) stopping the advance of the rolling tool just in time to avoid complete severance of an annular end portion from the tube stock by the rolling tool;

(iv) subsequently completing severance of the end portion to constitute a said ring;

(v) after stopping the advance of the rolling tool but whilst the end portion is not yet fully severed, machining the unsevered circumferential surface of the end portion to its required diameter;

(vi) radially retracting the rolling tool; and

(vii) axially feeding the tube stock forward ready for making the next ring;

characterised in that a grooving tool is advanced in a generally radial direction simultaneously with the rolling tool, to form on the tube stock a substantially V-shaped, circumferential locating groove spaced axially from the parting groove by a predetermined distance with the parting groove lying between the locating groove and the annular end portion, the tube stock in step (vii) being fed forward by an amount approximately equal to said predetermined distance so that the locating groove lies opposite the rolling tool, and the rolling tool being guided by the locating groove at the commencement of its next advance into the tube stock, so as to be in exact register with the locating groove.

4,302,959

## METHOD OF FORMING HELICAL SPRINGS

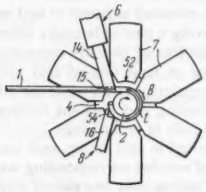
Vladimir K. Yakovlev, ulitsa Moskovskaya, 25, kv. 9; Elektron P. Lugovoi, pereulok Krasnoarmeisky, 73, kv. 21, and Vasily A. Ivankov, pereulok Krasnoarmeisky, 92, kv. 16, all of Azov Rostovskoi oblasti, U.S.S.R.

Continuation of Ser. No. 856,766, Nov. 29, 1977, abandoned.

This application Jul. 5, 1979, Ser. No. 55,296

Int. Cl.³ B21F *3/04*

U.S. Cl. 72—138 5 Claims



1. A method of a forming helical cylindrical spring form a bar on a cantilevered-mounted rotating mandrel, said rotating mandrel having a cylindrical surface, an axis and an unsupported end, comprising the steps of: feeding an end of said bar onto said cylindrical surface; applying a first source of pressing force to said end at a first position normal to said cylindrical surface; rotating said first source of pressing force at a speed substantially equal to a speed of said mandrel whereby said bar is bent around said mandrel; releasing said first source of pressing force from said end at a second position; said second position being substantially less than 360 degrees from said first position; applying a second source of pressing force to said bar at said first position before said first source of pressing force has rotated to said second position whereby said bar is simultaneously pressed to said cylindrical surface by at least two sources of pressing force; rotating said second source of pressing force at a speed substantially equal to said speed of said mandrel; releasing said second source of pressing force from said bar at said second position; applying successive sources of pressing force at said first position and releasing each of them at said second position whereby a plurality of turns of said helical cylindrical spring are formed; and applying a shifting force to each of said turns to shift each of said turns a predetermined distance toward said unsupported end, the shift being effective to produce a predetermined pitch of said helical cylindrical spring.

4,302,960

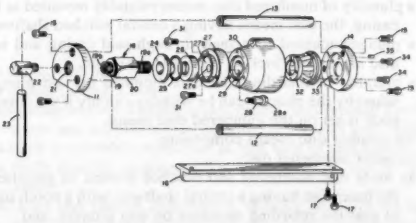
## PORTABLE HOSE FITTING CRIMPING DEVICE

Dale H. Leiker, Manitowoc, Wis., assignor to Gould Inc., Rolling Meadows, Ill.

Filed Oct. 25, 1979, Ser. No. 87,966

Int. Cl.³ B21D *41/04*

U.S. Cl. 72—402 6 Claims



1. Apparatus for crimping a coupling to a hose comprising a

relatively elongated portable frame having a first end plate apertured to receive a portion of said hose with said fitting uncrimpedly mounted thereon, a second end plate on said frame having a threaded bore extending longitudinally therethrough, a thrust screw mounted in said bore and movable axially therein to position one screw end interiorly of said frame, said thrust screw end being equipped with a connection for mounting crimping cam means, said first end plate also being equipped with a connection for mounting crimping cam means, a camming crimping bowl mounted on one said connectors and a camming crimping cartridge removably mounted on the other of said connectors, said cartridge including a first plate in combination with a second plate for supporting a plurality of dies movable radially inward of said axis to crimp said fitting and being readily removable for replacement to crimp a different diameter fitting.

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**4,302,961**

## PRESS OR SIMILAR MACHINE TOOL

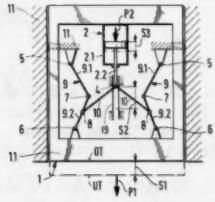
**Werner Leinhaas, Leipziger Str. 40 a, 6460 Gelnhausen, Fed. Rep. of Germany**

**Filed Sep. 28, 1979, Ser. No. 79,946**

**Claims priority, application Fed. Rep. of Germany, Jun. 23, 1979, 2925416**

**Int. Cl.³ B21J** *9/18*

**U.S. Cl. 72—451** **15 Claims**



**1**. A press or similar machine tool, comprising a frame type tool carrier (**1**), a pair of identical buckling toggle-lever systems (**9**) connected to said frame type tool carrier and to a machine base (**11**) which slidingly supports said tool carrier and a drive system (**2** or **3**) operatively connected to cause the buckling and elongating of said toggle lever systems thereby reciprocating the tool carrier, and mounting means mounting said drive system exclusively in said tool carrier.

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**4,302,962**

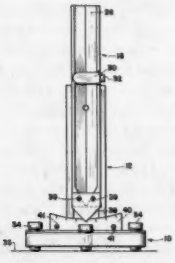
## INCLINOMETER TEST ASSEMBLY

**Henry L. Williams, Oklahoma City, Okla., assignor to The Geolograph Company, Oklahoma City, Okla.**

**Filed Oct. 5, 1979, Ser. No. 82,112**

**Int. Cl.³ G01C** *25/00*

**U.S. Cl. 73—1 E** **2 Claims**



**1**. An inclinometer test assembly comprising a horizontal base plate, a vertical column affixed to said base plate, a support arm pivotally mounted intermediate its ends on said column, said arm having a longitudinally extending recess for receiving the cylindrical body of an inclinometer therein for the purpose of testing said inclinometer, means for securing said inclinometer body within said recess, means for leveling said base plate, and means for maintaining said arm in predetermined known positions relative to the true vertical, said pivotal mounting for said arm comprising a pivot shaft rotatably received in said column, said pivot shaft having one end affixed to said arm having an opposite end extending outwardly beyond said column, said means for maintaining said arm in predetermined positions comprising a clamp with a thumb screw extending through said clamp, said opposite end of said shaft being received in said clamp and being frictionally engaged by said clamp upon tightening of said thumb screw.

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**4,302,963**

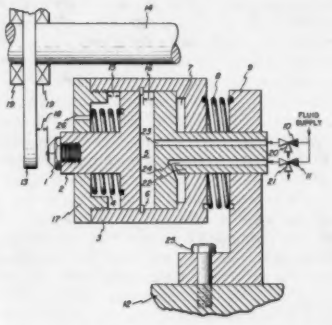
## THRUST BEARING WEAR DETECTOR POSITIONER

**David J. Collins, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed May 12, 1980, Ser. No. 149,180**

**Int. Cl.³ G01M** *13/04, 13/00*

**U.S. Cl. 73—1 J** **9 Claims**



**1**. An apparatus for positioning a sensor with respect to a movable component, such as a rotating turbine, within housing, said apparatus comprising:

a first piston fixed with respect to said housing, said first piston having first and second fluid channels therein;

a movable casing in which said first piston is slidable between two stops within said casing, said first piston dividing the interior of said casing into two pressurizable volumes, a first volume in communication with said first fluid channel and a second volume in communication with said second fluid channel;

first bias means urging said casing in a given direction with respect to said first piston, said direction tending to reduce said first volume;

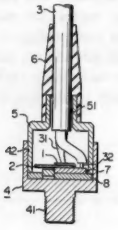
a second piston slidable between two stops within said casing, said second piston, said first piston and said casing defining said second volume; and

second bias means urging said second piston in a given direction with respect to said casing, said direction tending to reduce said second volume.

## 4,302,964
## KNOCK SENSOR

Daisaku Sawada, Susono; Juhei Takahashi, and Kenzo Miura, both of Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Jan. 14, 1980, Ser. No. 112,136
Claims priority, application Japan, Jan. 29, 1979, 54/9505
Int. Cl.[3] G01L *23/22;* G01N *15/00*
U.S. Cl. 73—35 2 Claims



1. A knock sensor comprising:

a metal case having a multi-sided outer peripheral shape and including in a lower part thereof a projected portion adapted for fixedly fastening said case to an engine, said metal case having a vibrator receiving opening in an upper part thereof;

a vibrator for detecting a knock of said engine, said vibrator being mounted on a supporting plate so that one end of said vibrator extends beyond a corresponding end of said supporting plate, a first surface of said vibrator and a surface of said supporting plate being electrically conductive and in contact with each other;

a base having a size for being placed in said vibrator receiving opening, said base having on a surface thereof a projection and a guide means for respectively guiding and positioning said supporting plate and a vibrator keeper;

said vibrator keeper pressing and securing the remaining end of said vibrator against said supporting plate and being in electrical contact with a second surface of said vibrator, said keeper being locked by said guide means; and

a cover having a periphery of a size fitted to said vibrator receiving opening of said metal case and having a through hole at the center of said cover for receiving a sealed cable, said cable having a core and a sheath, one of which is connected to said supporting plate and the other of which is connected to said keeper, said cover being accommodated in said opening of said metal case whereby an edge of said cover securely locks said base in place.

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## 4,302,965
## VISCOMETER

Timothy W. Johnson, and Marion T. O'Shaughnessy, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 29, 1979, Ser. No. 53,446
Int. Cl.[3] G01N *11/08;* G01F *23/26*
U.S. Cl. 73—55 9 Claims

1. A method for determining the viscosity of a fluid at a temperature above the normal boiling point of at least one component in the fluid comprising the steps of:

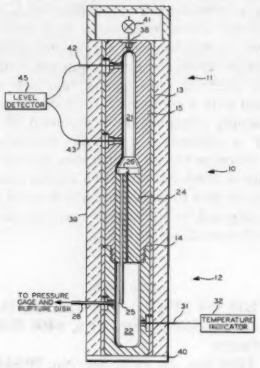
placing said fluid in a first portion of a viscometer;

pressure sealing said viscometer;

heating said fluid to said temperature;

orienting said viscometer in such a manner that said fluid flows through a capillary tube into a second portion of said viscometer;

measuring the time required for a known volume of said fluid to flow through said capillary tube into said second portion of said viscometer; and




determining the viscosity of said fluid at said temperature based on the time required for a known volume of said fluid to flow through said capillary tube into said second portion of said viscometer.

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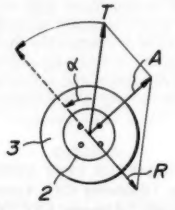
## 4,302,966
## METHOD OF ASSEMBLING A WHEEL TIRE

Hiroshi Ohnishi, Kunitachi; Hiroshi Fukuyama, Higashimurayama, and Yasushi Yokota, Kawasaki, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Jan. 25, 1980, Ser. No. 115,325
Claims priority, application Japan, Jan. 30, 1979, 54-8677
Int. Cl.[3] G01M *1/14*
U.S. Cl. 73—66 1 Claim



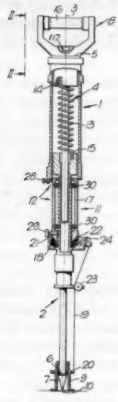

1. In a method of balancing and assembling wheels with tires wherein any unbalance of a tire and a rim are determined and the tire is secured to the rim in a position so that the vectors of balance necessary to achieve static balance of the tire and the rim separately are at least approximately directed opposite each other and any remaining unbalance is compensated by dynamically balancing the tire and the rim, the improvement comprising the steps of: determining the static balance force (R) of the rim by dynamic measurement of the balance; mounting the tire to the rim in any desired angular position without previously determining its unbalance or the corresponding static balancing force (T), determining by dynamic measurement of any unbalance the static balancing force (A) necessary for statically balancing the assembled tire and rim; determining the static balancing force (T) by vectorially substracting (T=A−R) the static balancing force of the (R) from the static balancing force of the assembled tire and rim (R) and, turning the tire on the rim so that the balancing force (T) is directed opposite the balancing force (R) of the rim.

4,302,967

## APPARATUS FOR MEASURING THE MECHANICAL CHARACTERISTICS OF A BODY

Victor A. Dufey, Chaussee de Namur 74, B-5800 Gembloux, Belgium

Filed May 27, 1980, Ser. No. 153,658
Claims priority, application Belgium, May 30, 1979, 195472
Int. Cl.[3] G01N 3/00
U.S. Cl. 73—84 15 Claims



1. An apparatus for measuring mechanical characteristics of a body or medium, such as soil, comprising two elements aligned in accordance with their common axis; first means provided between said two elements and arranged to combine them and to oppose the relative displacements of said elements along their common axis, when a stress along the said axis is applied at the free end of one of these elements and directed towards the other element; and also to oppose the rotation of the elements in relation to each other around their axis, a probe affixed to the free end of one of the elements; second means provided at the free end of the other element to enable the aforementioned stress to be applied in accordance with the axis of the elements and a torque to be applied to the elements in relation to their axis; a cursor arranged to move along the element bearing the probe, parallel to the axis of the said element, from the free end of the probe towards the other element, when the probe penetrates into the body or medium to be measured; and third means arranged, in a first position, to enable the aforementioned stress along the axis of the element bearing the probe and the displacement of the cursor on the element bearing the probe to be measured simultaneously and, in a second position, for the simultaneous measurement of said stress along the axis of the elements and the aforementioned torque, the conversion from the said first position to said second position being obtained by a locking appliance able to solidarize said third means to the element bearing the probe.

4,302,968

## METHOD AND APPARATUS FOR MEASURING THE LINEAR DENSITY OF A TRAVELLING FIBER SLIVER

Robert Moser, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

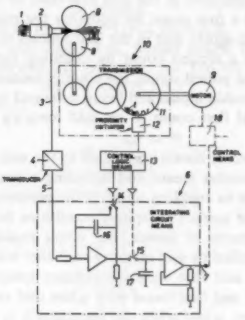
Filed Oct. 15, 1979, Ser. No. 84,894
Int. Cl.[3] G01B 13/04; D01H 5/52
U.S. Cl. 73—160 15 Claims

1. A method of producing a signal representing a given characteristic of a textile material, said method comprising the steps of:

passing a textile material of varying linear density past a sensor responsive to the speed of flow of the material and the given characteristic;

generating a pressure output signal from the sensor in dependence on the speed of flow of the material and the given characteristic;

generating a further electrical signal defining a series of intervals, each interval being of short duration and corresponding to a determinable length of textile material passing the sensor; and



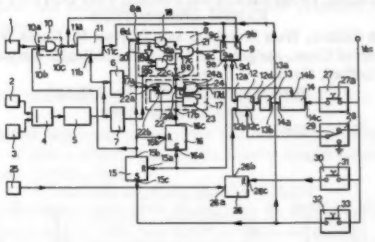
integrating said output signal over each successive interval to produce a signal representative of the given characteristic and substantially independent of the speed of flow of the material.

4,302,969

## APPARATUS FOR DETECTING CLIMATIC CONDITIONS FAVORING THE DEVELOPMENT OF SCAB ON FRUIT TREES

Gian Paolo Tavoni, Cambiano, and Mario Baima, Turin, both of Italy, assignors to Centro Ricerche Fiat S.p.A., Orbassano, Italy

Filed Jun. 10, 1980, Ser. No. 158,047
Claims priority, application Italy, Jul. 18, 1979, 68490 A/79
Int. Cl.[3] G01W 1/06
U.S. Cl. 73—170 R 9 Claims



1. Apparatus for detecting the climatic conditions favourable to the development of scab on fruit trees and for indicating when to effect a fungicidal treatment thereof, said apparatus comprising:

a memory settable into first and second states which correspondingly determine first and second operational states of the apparatus;

a manually-operable control device for setting said memory into its said first state;

monitoring device controlled by said memory to operate in accordance with the current state of the apparatus, said monitoring device including:

temperature and humidity sensors arranged to monitor the ambient temperature and humidity,

a pulsed signal generator connected to said sensors and arranged to output a first pulsed signal to be counted

when the apparatus is in its said first state, and a second pulsed signal to be counted when the apparatus is in its said second state, the frequencies of said first and second pulsed signals being differently related to the ambient temperature and humidity, and

counter means connected to said pulsed signal generator and operative in the said first state of the apparatus to effect a first count by counting the pulses of said first pulsed signal, and in the said second apparatus state to effect a second count by counting the pulses of said second pulsed signal, the counter means including reset and enable inputs and being arranged upon completion of said first count to set said memory into its second state,

count enable means connected to the said enable input of the counter means and including a sensor arranged to output an enabling signal in the presence of leaf saturation or surface dampness conditions favouring the development of spores, the count enable means being controlled by said memory such that with the apparatus in its said first state the counter means is enabled to effect said first count only when said enabling signal is present, while when the apparatus is in its second state the counter means is continuously enabled to effect said second count,

a timer circuit connected to said count enable means and operative in the absence of said enabling signal when the apparatus is in its first state, to time a delay period upon the completion of which said timer circuit is arranged to output a reset signal to the said reset input of the counter means, the reappearance of said enabling signal during the timing of said delay period being arranged to deactivate the timer circuit, and

output means connected to said monitoring device and operable to provide a visual indication of the progress of the counting being effected by the said counter means.

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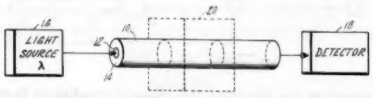
**4,302,970**

## OPTICAL TEMPERATURE PROBE EMPLOYING RARE EARTH ABSORPTION

**Elias Snitzer, West Hartford, and William H. Glenn, Vernon, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed May 9, 1980, Ser. No. 148,343**
**Int. Cl.³ G01K *1/00***
**U.S. Cl. 73—339 R** **7 Claims**




1. A temperature measuring device, comprising:

a source means for providing a beam of light energy;

optical means positionable at a location where temperature is to be measured, forming an optical waveguide through which said beam of light can propagate, said optical means having an absorption characteristic that varies as a function of temperature resulting from a host doped with a trivalent rare earth element;

detector means responsive to light energy emerging from said optical means for indicating the amount of light energy absorbed within said optical means; and

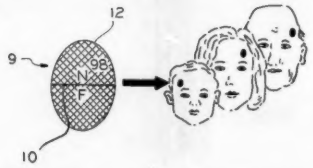
whereby said temperature measuring device provides an output signal that is uniquely related to the temperature at the location of said optical waveguide.

**4,302,971**

## LIQUID CRYSTAL TEMPERATURE INDICATOR FOR MEASURING HUMAN BODY TEMPERATURE

**Catherine M. Luk, Kowloon, Hong Kong, assignor to Carice International Products, Ltd., Hong Kong, Hong Kong**

**Continuation-in-part of Ser. No. 940,746, Sep. 8, 1978, Pat. No. 4,198,861. This application Nov. 5, 1979, Ser. No. 91,042**
**Claims priority, application European Pat. Off., May 2, 1979, 101328/79; United Kingdom, Sep. 12, 1977, 37991/77**
**The portion of the term of this patent subsequent to Apr. 22, 1997, has been disclaimed.**
**Int. Cl.³ G01K *11/12***
**U.S. Cl. 73—356** **7 Claims**




1. A liquid crystal temperature indicator for measuring human body temperature, which temperature indicator comprises a generally planar member suitable for retention against a surface of a body, a plurality of numerals formed at different locations on said planar member; the member comprising a transparent plastic film over a plurality of deposits of liquid crystals deposited behind individually associated ones of said numerals, each of said deposits being activatable within an individually associated predetermined temperature range corresponding to a body temperature which is to be measured and being arranged so that, on temperature activation, the deposits emit or reflect visible radiation to make the associated numerals visible at the front of the member, the visible numerals indicating the temperature of the body, an optical filter between said numerals and said liquid crystal deposits for reducing or blocking a blue color response of the liquid crystals upon activation, and unbroken waterproof coating means completely surrounding and encapsulating on all sides of the entire indicator for protecting the deposits from moisture or humidity between said numerals and said liquid crystal deposits.

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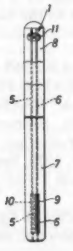
**4,302,972**

## APPARATUS FOR MEASURING TEMPERATURE AND A METHOD OF PRODUCING SAME

**George W. Oettle, Woodbridge, N.J., and Bo H. Hakansson, Lund, Sweden, assignors to Crafon Medical AB, Sweden**

**Filed Jun. 1, 1979, Ser. No. 44,387**
**Claims priority, application Sweden, Jan. 25, 1979, 7900673**
**Int. Cl.³ G01K *7/22***
**U.S. Cl. 73—362 AR** **12 Claims**




1. Apparatus for measuring temperature within a predetermined range for medical applications and the like comprising:

first and second temperature measuring sensors, each of said

sensors exhibiting at least one corresponding measurable electrical characteristic which varies as a function of temperature, each of said sensors having a measured value for said electrical characteristic at a selected temperature within said predetermined range and said measured value for said electrical characteristic for each sensor at said selected temperature corresponding to a determined value and a selected deviation from said determined value so that the composite value of said selected deviations at a single selected temperature is such that said selective deviations substantially cancel each other out;

means for electrically interconnecting said first and second sensor means; and

conductor means connected to said first and second temperature measuring sensors for providing an output corresponding to the resultant value of said corresponding, measurable electrical characteristics of said interconnected first and second temperature measuring sensors, said measured value of said electrical characteristic at said selected temperature for aid first and second temperature measuring sensors yielding a resultant value for said electrical characteristics of said first and second temperature measuring sensors at said selected temperature and throughout said predetermined range which corresponds to a resultant value obtained by interconnection of first and second temperature measuring sensors having electrical characteristics substantially equal to said determined value at said selected temperature and varying in accordance therewith throughout said predetermined range.

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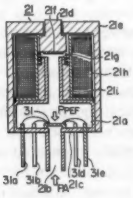
**4,302,973**

## ALTITUDE DIFFERENCE MEASURING APPARATUS

**Yasuhisa Yoshino, Okazaki; Akira Kuno, Oobu, and Yoshio Shinoda, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan**

**Filed Jan. 4, 1980, Ser. No. 109,515**
**Claims priority, application Japan, Jan. 23, 1979, 54-6920**
**Int. Cl.³ G01L *7/08*; G01C *71/00***
**U.S. Cl. 73—384** **4 Claims**




1. An altitude difference measuring apparatus for measuring the difference between altitudes at a first and at a second point comprising:

a solid wall member forming a chamber of a fixed volume and having first and second openings communicating with the atmosphere;

a semiconductor pressure sensor positioned to hermetically seal said first opening of said wall member, said pressure sensor delivering an electric signal corresponding to the difference between the pressures present in said chamber and in the atmosphere;

an electromagnetic valve positioned adjacent to said second opening of said wall member and including a winding and a movable core, said movable core being normally biased to allow said chamber of said wall member to communicate with the atmosphere through said second opening and effective to hermetically seal said second opening during the energization of said winding;

a circuit means for energizing said winding of said electromagnetic valve from the arrival at said first point until after the arrival at said second point;

sample and hold means for sampling and holding said electric signal developed from said pressure sensor in synchronism with the arrival at said second point; and

altitude difference detecting means for detecting the difference between the altitudes of said first and second points in response to the sampled and held electric signal.

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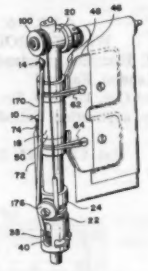
**4,302,974**

## WATER SAMPLING DEVICE

**Shale J. Niskin, 3415 Chase Ave., Miami Beach, Fla. 33140**

**Filed Jan. 30, 1980, Ser. No. 116,755**
**Int. Cl.³ G01N *1/12***
**U.S. Cl. 73—864.62** **12 Claims**




1. In a water sampling device having a pliable container, with an initially sealed opening, mounted in a deflated condition on a framework and means for spreading apart the sides of said pliable container to draw water through said opening when unsealed, the improvement comprising:

said framework including sealing means for securing said pliable container in at least a partially rolled condition to seal said opening;

said framework further including opening means for unrolling said pliable container to expose said opening;

said framework further including resealing means for rolling said pliable container to reseal said opening after said means for spreading apart the sides of said pliable container has substantially filled said pliable container with water.

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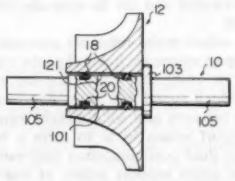
**4,302,975**

## DEVICE FOR HOLDING A ROTOR BODY IN A BALANCE TESTOR

**Matsuyoshi Sugiyama, Susono, and Hiroshi Okano, Mishima, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Feb. 25, 1980, Ser. No. 124,276**
**Claims priority, application Japan, Dec. 18, 1979, 54-163458**
**Int. Cl.³ G01M *1/06***
**U.S. Cl. 73—460** **1 Claim**




1. A balance testor comprising;

a pair of bearing units;

a shaft for receiving a rotor body to be tested;

a pair of pick-up units adapted for detecting the force ap-

plied to the bearing units during the rotation of the shaft and providing elastic signals corresponding to the force;

a stopper formed on the shaft for placing the rotor body on a predetermined axial position of the shaft;

the shaft being provided with a first portion of a large diameter on which the rotor body is located and a second position of a small diameter, the large diameter portion being provided with axially spaced apart annular grooves on the outer surface thereof; and

ring members made of an elastic material, said members being, on the inner side thereof, fitted to the respective grooves and being, on the outer side thereof, contacting with the inner surface of the rotor body.

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**4,302,976**

## WHEEL PROBES

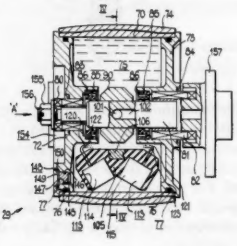
**Reginald B. Bull, Thatcham, England, assignor to British Gas Corporation, London, England**

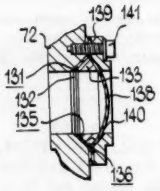
**Filed Oct. 17, 1979, Ser. No. 85,701**

**Claims priority, application United Kingdom, Jul. 19, 1979, 25199/79**

**Int. Cl.³ G01N *29/04***

**U.S. Cl. 73—639** **9 Claims**






5. An inspection device for ultrasonically inspecting a component, said inspection device comprising

a wheel probe support means, said wheel probe support means including a duct means therein and mounting at least one obturator which is exposed on one side to the ambient environment in which the wheel probe support means is located and on its opposite side to said duct means, and

at least one wheel probe rotatably mounted on said wheel probe support means, each wheel probe comprising a solid annular rim composed of a non-deformable material through which sound will pass, side members sealingly extending between said solid annular rim and the wheel probe support means so as to form a hollow chamber which is in fluid communication with said duct means in said wheel probe support means, at least one ultrasonic transducer mounted in said hollow chamber which is capable of sending and receiving sound through said annular rim, and a solid, resilient tire member mounted on the annular rim on the side thereof opposite said hollow chamber,

the hollow chamber in each said wheel probe and the duct means in said wheel probe support means being filled with acoustic coupling liquid such that said obturator will act to balance the pressure of said acoustic coupling liquid in said inspection device with the pressure of the ambient environment.

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**4,302,977**

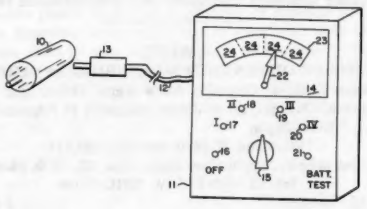
## VIBRATION SEVERITY INDICATOR

**Edwin D. Sisson, Worthington, and Carl J. Spehr, Gahanna, both of Ohio, assignors to IRD Mechanalysis, Inc., Columbus, Ohio**

**Filed Apr. 4, 1980, Ser. No. 137,552**

**Int. Cl.³ G01N *29/00***

**U.S. Cl. 73—658** **3 Claims**




1. A vibration severity indicator for displaying transducer derived vibration levels of machines having predetermined machine classifications comprising:

conductor means connectable with said transducer for receiving electrical signals therefrom related to an instantaneous vibration amplitude of a said machine;

a plurality of serially connected resistors for receiving said signals including contacts for effecting select electrical connections between adjacent ones of said resistors;

means for conveying said signals to said plurality of resistors;

switch means manually actuable for electrical communication with selected ones of said contacts and having visible indicia associated with each said contact corresponding with a unique said machine classification;

amplifier means coupled with said switch means for amplifying the signal derived from a selected said contact;

converter means coupled with said amplifier means for deriving an output signal corresponding with the logarithm of the RMS value of said amplified signal;

a direct current meter responsive to said output signal for providing a readout indicating the instantaneous direct current value of said converter means output signal on a basis from zero to full scale, said meter having a common scale with indicia comprised of segments of predetermined width extending in mutual adjacency substantially from the zero to full scale of said meter, each said segment having a visual indication associated therewith representative of a qualitative evaluation of said vibration levels;

said resistors having resistance values selected to provide said zero to full scale basis in correspondence with a fixed range of vibration levels expressed in decibels.

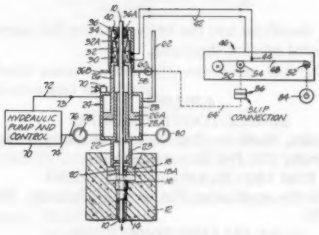
## 4,302,978
## MEANS AND TECHNIQUES USEFUL IN STRESSING CABLE

**Maximiliaan J. Dykmans, c/o Lyon & Lyon, 800 Wilshire Blvd., Los Angeles, Calif. 90017**

**Division of Ser. No. 678,890, Apr. 21, 1976, abandoned, which is a continuation of Ser. No. 519,938, Nov. 1, 1974, abandoned, which is a continuation of Ser. No. 323,760, Jan. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 153,601, Jun. 16, 1971, abandoned. This application Nov. 11, 1977, Ser. No. 850,687**

**Int. Cl.³ G01N *3/36*; B28B *21/60***

**U.S. Cl. 73—828** **10 Claims**




1. In a method in which a prestressing cable extends through a long conduit with which said cable is in frictional engagement and said cable extends through releasable cable clamping means and has a force applied thereto by a power operated member to overcome said frictional engagement and move said cable through said conduit and through said clamping means to cause such cable clamping means to operate to clamp said cable and to thereafter upon continued movement of said member to cause said cable to be tensioned, and in which a two-dimensional recording means having a first control means and a second control means is operative jointly to produce a two-dimensional permanent recording wherein the improvement comprises operating said first control means in accordance with the movement of said cable through said conduit and through clamping means and operating said second control means simultaneously in accordance with the force exerted by said member on said cable in producing said movement through said conduit and through said clamping means to clamp the cable to thereby obtain a two-dimensional recording representative of the forces applied to said cable to overcome frictional forces developed by said frictional engagement between said cable and said conduit and to subsequently elongate said cable after said cable is clamped by said clamping means.

## 4,302,979
## MEANS AND TECHNIQUES USEFUL IN STRESSING CABLE

**Maximiliaan J. Dykmans, Box 696, El Cajon, Calif. 92022**

**Continuation of Ser. No. 678,890, Apr. 21, 1976, abandoned, which is a continuation of Ser. No. 519,938, Nov. 1, 1974, abandoned, which is a continuation of Ser. No. 323,760, Jan. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 153,601, Jun. 16, 1971, abandoned. This application Mar. 6, 1978, Ser. No. 883,936**

**Int. Cl.³ G01N *3/36*; B28B *21/60***

**U.S. Cl. 73—828** **21 Claims**

1. A system for prestressing a cable and continuously sensing and recording the force applied to, the axial movement of, and the elongation of the cable comprising:

a first means for releasably engaging the cable,

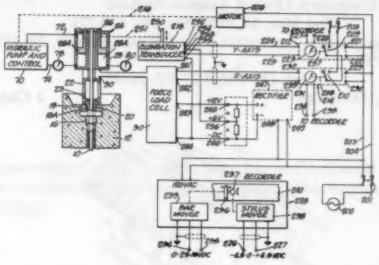
a power operated member operatively associated with said means for engaging the cable such that said member is capable of exerting prestressing force on the cable,

recording means having a recording element and a first and second control element which determine the character of the recording made by the recording element,

said member being capable of moving said cable in an axial direction and of elongating said cable,

a second means for releasably engaging said cable and for preventing substantial loss of the tensile stress applied to the cable by the member when said first means for engaging said cable is disengaged,

means for sensing axial movement and elongation of the cable operatively connected to said first control element,




means for sensing the force applied to said cable by said member operatively connected to said second control element,

said control elements being capable of controlling said recording element in response to said sensing means to produce a simultaneous and continuous record in said recording means of the axial movement of, elongation of, and force applied to the cable.

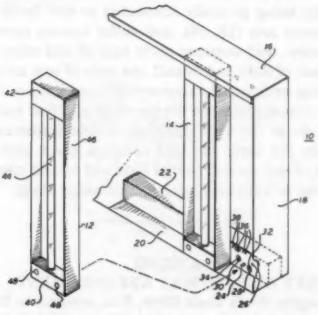
## 4,302,980
## ANESTHESIA MACHINE WITH MODULAR FLOWMETERS

**Robert E. Braatz, Sun Prairie, Wis., assignor to Airco, Inc., Montvale, N.J.**

**Filed Oct. 19, 1979, Ser. No. 86,963**

**Int. Cl.³ G01F *1/22***

**U.S. Cl. 73—861.55** **2 Claims**



1. A precalibrated flowmeter module for assembly in an anesthesia machine, said flowmeter module comprising a lower manifold, inlet means and outlet means in said lower manifold adapted to receive and discharge, respectively, a gas, a flowtube, a floating indicator within said flowtube and a scale to record the position of said floating indicator, said flowtube, floating indicator and scale being calibrated by the position of said scale, said lower manifold further comprising a flowtube inlet for introducing the gas into said flowtube, an upper manifold, and a flowtube outlet in said upper manifold for receiving gas from said flowtube, tubing means connecting said flowtube outlet with said outlet means, said flowmeter module further

having a C-shaped shroud, protective means affixing said shroud to said upper and lower manifolds enclosing said module to inhibit removal of said shroud and disassembly of said flowtube, floating indicator and said scale.

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**4,302,981**

## LONGITUDINAL DRIVE MECHANISMS

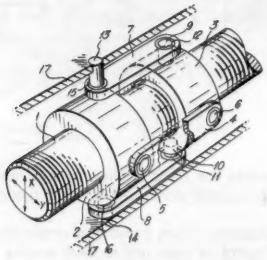
**William G. Wayman, New Barnet, England, assignor to Crosfield Electronics Limited, London, England**

**Filed Mar. 12, 1980, Ser. No. 129,771**

**Claims priority, application United Kingdom, Mar. 20, 1979, 09727/79**

**Int. Cl.³ F16H *27/02, 29/02***

**U.S. Cl. 74—89.15** **3 Claims**



1. A longitudinal drive mechanism, comprising: a leadscrew (1), a nut (2), said nut being in screwthreaded engagement with said leadscrew whereby it moves axially along said leadscrew upon rotation of said leadscrew, a collar (3), a first pair of links (4), one end of each of said first pair of links being pivotally connected to said nut with a common pivot axis (5), the other end of each of said first pair of links being pivotally connected to said collar with a common pivot axis (6), a driver (17), and a second pair of links (7, 8), one end of each of said second pair of links being pivotally connected to said collar with a common pivot axis (9, 10) and the other end of each of said second pair of links being pivotally connected to said driver with a common pivot axis (13, 14), said collar loosely surrounding said leadscrew, said common pivot axes of said other ends of said first pair of links and of said one ends of said second pair of links being orthogonal to one another and lying in the same plane, the distance between the pivots of said first and second pairs of links in the axial direction of said leadscrew being substantially the same and said common pivot axes of said other ends of said second pair of links and of said one ends of said first pair of links also lying in a common plane.

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**4,302,982**

## KEY AND KEYWAY ARRANGEMENT

**Ralph D'Angelo, South Toms River, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 8, 1980, Ser. No. 147,705**

**Int. Cl.³ F16H *27/02***

**U.S. Cl. 74—89.15** **2 Claims**

1. A key and keyway arrangement comprising:

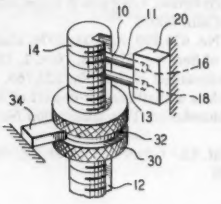
a first member (14) including a longitudinal keyway (12), and

a second member (20) positioned adjacent to said keyway in said first member

characterized in that

the second member includes a pair of spaced-apart apertures (16,18) aligned with the keyway in the first member, and

the arrangement further comprises a curved wire key (10) including a pair of straight end sections (11,13), each end section disposed in a separate one of said spaced-apart apertures included in said second member, said wire protruding therefrom into the keyway of the first member in a tangential relation therewith.



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**4,302,983**

## SINGLE-TOOTH GEARING

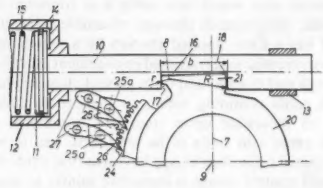
**Hubert Schmölz, Nattheim, Fed. Rep. of Germany, assignor to Voith Getriebe KG, Fed. Rep. of Germany**

**Filed Mar. 20, 1980, Ser. No. 132,301**

**Claims priority, application Fed. Rep. of Germany, Mar. 23, 1979, 2911424**

**Int. Cl.³ F16H *21/44, 25/18***

**U.S. Cl. 74—104** **14 Claims**



1. A single-tooth gearing, comprising:

a rod for reciprocating motion, having a tooth gap in one side thereof, said tooth gap having first and second flanks spaced along said rod from each other and perpendicular to the reciprocating path of motion of said rod; and

a gear wheel mounted for rotation about an axis of rotation generally perpendicular to said reciprocating path of motion of said rod, said gear wheel having a tooth thereon having a first and a second convexly curved tooth flank for engaging said first and second flanks of said tooth gap, respectively, said first tooth flank having a radius of curvature greater than that of said second tooth flank, the distance between said tooth gap flanks is equal to the sum of their said radii of curvature.

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**4,302,984**

## ROLLER BEARING ASSEMBLY

**Nobuaki Katayama, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Jun. 15, 1979, Ser. No. 49,050**

**Claims priority, application Japan, Mar. 29, 1979, 54-37646**

**Int. Cl.³ F16H *3/08, 57/02*; F16C *33/46***

**U.S. Cl. 74—375** **5 Claims**

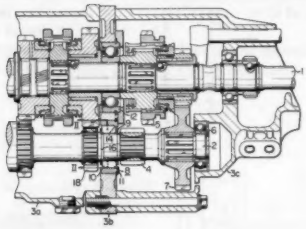
1. A roller bearing assembly comprising:

a surface of a shaft serving as an inner race for rolling bodies, said surface having a diameter smaller than the outer diameter of a gear formed integrally with the shaft;

a cylindrical outer race for the rolling bodies of a larger inner diameter than the outer diameter of the gear; and

a cage for the rolling bodies composed of two halves formed by splitting the cage radially of the shaft, said outer race having an interior shoulder adjacent one side of said bear-

ing assembly and said shaft being enlarged to define a shoulder facing said race shoulder adjacent the other side



of said assembly, whereby to confine said rolling bodies between said shoulders.

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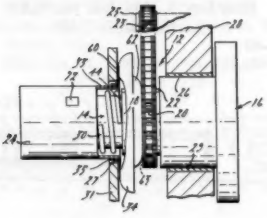
**4,302,985**

## PHASE CONTROLLING SYSTEM FOR TWO ROTATABLE SHAFTS

**Robert J. Natkin, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Dec. 21, 1979, Ser. No. 106,137**
**Int. Cl.³ F16H *35/06*; F01L *1/34*; F16D *3/10***
**U.S. Cl. 74—403** **12 Claims**



1. A phase controlling system between a rotatable driving shaft and a rotatable driven shaft, said system comprising:

a driving member coaxially mounted about one of said shafts for movement relative thereto;

said driving member drivingly engaged to said driven shaft and drivenly engaged to said driving shaft;

load responsive means connecting said driving member to said one shaft constructed to cause movement having angular and axial components of said driving member relative to said one shaft in proportional response to a torque load on said driven shaft whereby the angular phase relationship between said driving and driven shaft is established in a manner proportional to said torque load.

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**4,302,986**

## PLASTIC HUB TORSIONAL VIBRATION DAMPER

**Michael Shepherd, Indianapolis, Ind., assignor to Wallace Murray Corporation, New York, N.Y.**

**Continuation of Ser. No. 667,975, Mar. 18, 1976, abandoned. This application Feb. 6, 1978, Ser. No. 875,500**
**Int. Cl.³ F16F *15/10***
**U.S. Cl. 74—574** **6 Claims**

1. A torsional vibration damper of the type having a single outermost inertia ring secured to a central hub by means of a single, radially intermediate annular elastomer member, the hub coupled to a rotary shaft of an internal combustion engine for the purpose of damping torsional vibrations, the internal combustion engine operating within a range of engine speeds, the damper having two resonance peaks, the improvement comprising, forming the hub of a material of lesser density than the material from which the inertia member is formed whereby one of the two resonance peaks of the damper occurs beyond the upper range of engine speeds, and the other resonance peak

occurs within the engine operating range and is of lesser amplitude than the said peak occurring outside of the engine operating range.

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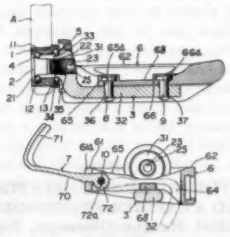
**4,302,987**

## PEDAL FOR BICYCLE

**Nobumi Takeda, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan**

**Filed Nov. 2, 1979, Ser. No. 90,624**
**Claims priority, application Japan, Nov. 11, 1978, 53-155525[U]**
**Int. Cl.³ G05G *1/14***
**U.S. Cl. 74—594.6** **2 Claims**



1. A pedal for a bicycle comprising:

a pedal shaft;

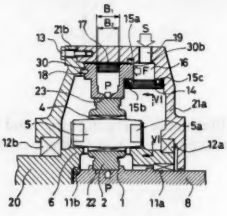
a pedal body supported on said pedal shaft, said pedal body being provided on its top face with a front treadle face and a rear treadle face, said rear treadle face having a through hole for accommodating a toe clip;

and a toe clip pivotally supported to said pedal body by a pivotal shaft on an inner side of the front treadle face extending in the same direction as that of the pedal shaft, said toe clip having an upwardly rising shoe placing portion, said shoe placing portion coming into contact against an inner wall of the through hole when said toe clip is pivoted into said through hole.

## 4,302,988
## PLANETARY-ROLLER TRANSMISSION WITH DEFORMABLE CLUTCHING ELEMENT

Hisayoshi Takahashi; Shoichi Oda, both of Nagoya; Hiroshi Satoh, and Itsuro Sakai, both of Tokyo, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha and Mitsubishi Jidosha Kogyo Kabushiki Kaisha, both of, Japan

Filed Sep. 6, 1979, Ser. No. 72,894
Claims priority, application Japan, Jul. 10, 1979, 54-87153
Int. Cl.[3] F16H *1/30, 13/02;* F16D *19/00*
U.S. Cl. 74—798 7 Claims



1. A planetary-roller transmission comprising:
a casing having a roller contact surface;
an input shaft rotatably mounted to said casing having a roller contact surface;
an output shaft rotatably mounted to said casing;
at least one planetary roller rotatably mounted to said output shaft having a roller contact surface engageable with said roller contact surfaces of said casing and said input shaft;
at least one of said input shaft and casing roller contact surfaces comprising a U-shaped contact ring having an axially extending web which carries said roller contact surface and a pair of radially extending legs extending from said web; and
pressure means connected to said at least one of said input shaft and casing for moving one of said legs axially closer to the other of said legs to form a crown in said web and bring said roller contact surface of said web into contact with said roller contact surface of said at least one planetary roller.

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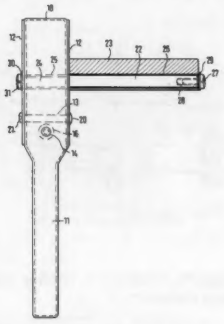
## 4,302,989
## APPARATUS FOR HOLDING PANELS FOR FASTENING TO A CARRIER FRAMEWORK

Reinhold Tolksdorf, Hadamar-Oberweyer, Fed. Rep. of Germany, assignor to Häfele KG, Nagold, Fed. Rep. of Germany

Filed Apr. 28, 1980, Ser. No. 144,429
Claims priority, application Fed. Rep. of Germany, Aug. 30, 1979, 2935069
Int. Cl.[3] B25B *7/00*
U.S. Cl. 81—5.1 R 8 Claims

1. A device for holding panels for fastening to a carrier framework, characterized in that it is comprised of two pivotally connected clamp elements (**11, 12**) which are maintained in clamping position by means of a compression spring (**16**), said clamp elements (**11, 12**) having jaws which in said clamping position form a generally rectangular clamp opening (**17**) corresponding in shape to the cross section of the cross laths of said carrier framework, and that a holding member (**23**) extending generally parallel to the pivot axis of said clamp elements (**11, 12**) is provided on at least one clamp element and projects at least from one side of said clamp element for holding said panels, the distance from said holding member (**23**) to said clamp opening (**17**) being adjustable.



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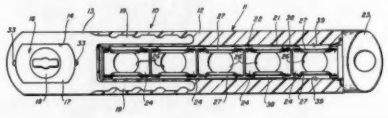
## 4,302,990
## SOCKET WRENCH

John P. Chrichton, Avon; John M. Trebel, Simsbury; George W. Cuff, East Haddam; David H. Goodwin, Prospect, all of Conn., and Edward D. Levy, Franklin Lakes, N.J., assignors to Litton Industrial Products, Inc., New Britain, Conn.

Filed Nov. 5, 1979, Ser. No. 91,500
Int. Cl.[3] B25B *13/46*
U.S. Cl. 81—60 8 Claims



1. In a socket wrench comprising a handle and a driving stud which is adapted to receive a selected one of a set of sockets, the combination comprising:
a grip and a frame comprising said handle, the driving stud being mounted on said frame,
a bore formed along the length of the handle,
an elongated tray dimensioned to hold a plurality of stud mating sockets and adapted for a sliding fit within the bore,
a plurality of compartments formed in said tray, each compartment having an open top and being sized to receive an individual socket,
lip means surmounting said open top for preventing accidential removal of a socket from said compartments, and
friction means for releasably securing said elongated tray in said bore.

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## 4,302,991
## FASTENER PLUNGING APPARATUS

S. Bernard Brouse, 14038 Terry Dr., Orland Park, Ill. 60462, and John Wiedel, 9024 S. Oakley, Chicago, Ill. 60620

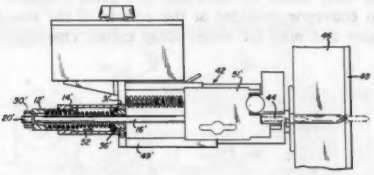
Filed Feb. 28, 1980, Ser. No. 125,607
Int. Cl.[3] B25B *23/00*
U.S. Cl. 81—429 2 Claims

1. In a fastener drive apparatus, said apparatus having a set of first and second telescoping elements with a passage therethrough, a driver element for receipt in said passage and adapted on one end for engaging a fastener, and means for biasing said elements to a normally extended position
the improvement in which said apparatus further comprises:
a second set of telescoping elements comprising first and

second concentrically mounted elongated axially slidable members also having a passage therethrough for receipt of the driver element,

said members of the second set of telescoping elements being connected end-to-end with the first set so as to be axially movable therewith, and

separate means for biasing said members of the second set to a normal fully extended position, the force exerted by said



separate biasing means being substantially less than the force exerted by the biasing means of said first set, so that a limited axial force exerted on said driver will collapse the first set, plunging the fastener through a soft facing material prior to application of additional force for inserting the fastener into a hard backing material, and

means for limiting the collapsed length of the first set and thus the depth of plunge of the fastener.

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**4,302,992**

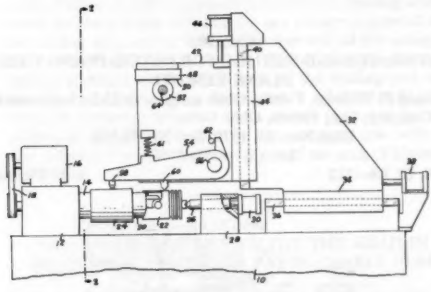
## PISTON TURNING MACHINE

**Frank C. Skrentner, Fenton, Mich., assignor to F. Jos. Lamb Company, Warren, Mich.**

**Filed Jan. 17, 1980, Ser. No. 113,054**

**Int. Cl.³ B23B *3/28***

**U.S. Cl. 82—19** **15 Claims**



**1.** A machine for turning a non-cylindrical piston of elliptical cross section which comprises, a support, means on said support for rotating a piston about its longitudinal central axis, a cylindrical cam having an elliptical cross section which corresponds in shape with the desired elliptical cross section of the piston, the longitudinal central axis of the cam being parallel to the axis of rotation of the piston, means for rotating the cam about is central axis at the same speed as the piston, a linear cam having a profile corresponding to the desired profile of the outer surface of the piston in axial section, support means for the linear cam, a cam follower adapted to follow the profile of the linear cam, support means for the cam follower, one of said support means being fixedly supported relative to said support and the other being displaceable in a direction parallel to the axis of rotation of the piston, said displaceable support means also being displaceable in a direction perpendicular to the rotating axis of the piston in response to relative movement between the linear cam and the cam follower, a tool holder mounted on the displaceable support means for movement therewith in a direction parallel to the axis of rotation of the piston and for movement thereon toward and away from said axis, a cutting tool on said tool holder adapted to machine the outer surface of the piston when the piston is rotated an the tool is moved axially thereof, a second cam follower mounted on said tool holder in fixed relation to said cutting tool and adapted to follow the contour of the elliptical cam when the latter is rotated and means for moving the displaceable support means in a path parallel to the axis of rotation of the piston whereby, when the piston is rotated and the displaceable support means are displaced in a path parallel to the axis of rotation of the piston, the cutting tool moves axially of the piston to generate thereon the profile of the linear cam and simultaneously moves radially of said axis to generate thereon the elliptical profile of the cylindrical cam.

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**4,302,993**

## MULTI-SPINDLE LATHES

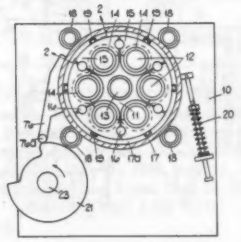
**Roy S. Dolman, Polesworth, Nr. Tamworth, England, assignor to White-BSA Tools Ltd., Birmingham, England**

**Filed May 22, 1979, Ser. No. 41,519**

**Claims priority, application United Kingdom, May 24, 1978, 22137/78**

**Int. Cl.³ B23B *19/00, 9/00***

**U.S. Cl. 82—29 R** **7 Claims**



**1.** A multi-spindle machine tool comprising a frame, a spindle carrier mounted on said frame, means for indexing said spindle carrier relative to said frame about an indexing axis, a plurality of work spindles rotatably mounted on said spindle carrier, each said work spindle being provided with workpiece-gripping means which can be opened and closed, a plurality of actuating elements each of which is mechanically connected to a respective one of said workpiece-gripping means and which is movable along the respective work spindle to open and close said respective workpiece-gripping means, a cam ring surrounding all of said work spindles and means for moving said cam ring angularly about said indexing axis, said cam ring having a cam surface which co-acts mechanically with said actuating elements such that said workpiece-gripping means can be opened and closed by effecting relative angular movement between said cam ring and said spindle carrier.

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**4,302,994**

## METHOD OF AND APPARATUS FOR REMOVING FRONT AND REAR SEGMENTS OF ROLLED WIRE

**Walter Kramp, Düsseldorf, and Clemens Philipp, Meerbusch, both of Fed. Rep. of Germany, assignors to Fried, Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany**

**Filed Mar. 20, 1980, Ser. No. 132,303**

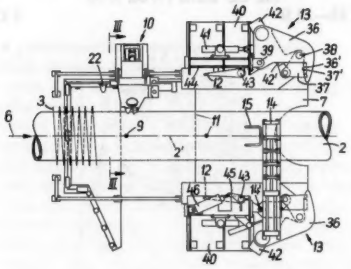
**Claims priority, application Fed. Rep. of Germany, Apr. 19, 1979, 2915716**

**Int. Cl.³ B21F *11/00***

**U.S. Cl. 83—23** **24 Claims**

**1.** A method of removing front and rear segments of a rolled wire which is fed in the form of winding packages to a collecting device and is subdivided by separating procedures into good and scrap windings, said method including the steps of:

spirally placing the windings of successive winding packages around a guide element;
moving said windings parallel to the longitudinal extension of said guide element;
temporarily preventing movement of the good windings of a given winding package;
severing said windings in the transition region between the scrap windings of the front segment of said given winding package and the subsequent temporarily retained good windings thereof;
further moving said scrap windings;
dividing said scrap windings;
removing said divided scrap windings from the region of said guide element;
temporarily preventing movement of the scrap windings of the rear segment of said given winding package;
separating the good windings of said given winding package in the transition region to the subsequent temporarily retained scrap windings thereof;
moving said good windings toward said collecting device;
removing said last mentioned scrap windings from the region of said guide element.



9. An apparatus for removing front and rear segments of a rolled wire which is to be fed to it in the form of winding packages, said apparatus being adapted to subdivide winding packages into good and scrap windings, being arranged ahead of a collecting device, and comprising:
a guide element which, in the longitudinal direction thereof, is adapted to movably support windings of winding packages which are in turn adapted to helically surround said guide element;
at least one separating cutter;
a plurality of scrap cutters connected subsequent to said at least one separating cutter in the direction of movement of said winding packages, said scrap cutters being provided with cutting edges which are pivotally arranged with respect to said guide element in the region of said windings; and
two stop elements sequentially arranged in the direction of movement of said winding packages, said stop elements being adapted to be moved toward said guide element and between two adjacent windings.

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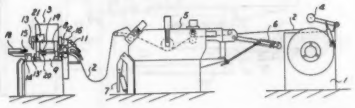
**4,302,995**

## APPARATUS FOR BLANKING METAL SHEET HAVING PARTS OF WELDED CONNECTION

**Toshio Iino, Ibaragi, Japan, assignor to Daiwa Can Company, Limited, Tokyo, Japan**

**Filed Mar. 21, 1980, Ser. No. 132,699**
**Claims priority, application Japan, Aug. 30, 1978, 53-118790**
**Int. Cl.³ B26D 7/18**
**U.S. Cl. 83—104** **1 Claim**

1. An apparatus for continuously blanking a continued metal sheet having parts of welded connection comprising a press for continuously blanking a continued metal sheet, which comprises a vertically movable upper press member, a fixed lower press member provided against the upper press member, a pair of an upper feed roll and a lower feed roll provided at the lower press member at a place where the metal sheet enters between said upper press member and lower press member to intermittently advance the metal sheet by a definite length through between said two press members, an upper scrap cutter provided at the upper press member and a lower scrap cutter fixed at the lower press member at a place where the metal sheet leaves between said two press members, and a scrap conveyor provided at the outside of the lower press member and near the lower scrap cutter, characterized by



selectively operable means for interlocking the upper scrap cutter with the upper press member for movement therewith, a device of elevating the upper feed roll, a pair of an upper subfeed roll and a lower subfeed roll for continuously and quickly advancing the metal sheet after the upper feed roll is elevated, a freely extendable slide guide being provided near and above the scrap conveyor and at a side opposite to the press with respect to the scrap conveyor and being extendable over the scrap conveyor, and an electric controller of sequentially actuating said interlocking means, the upper feed roll, a pair of the subfeed rolls, and the slide guide.

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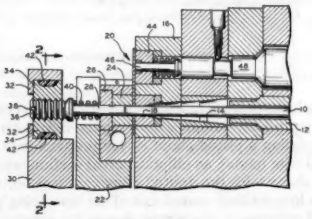
**4,302,996**

## APPARATUS AND METHOD FOR DETERMINING WIRE BLANK LENGTH

**Donald F. Wilhelm, Toledo, Ohio, assignor to Helm Instrument Company, Inc., Toledo, Ohio**

**Filed Nov. 13, 1979, Ser. No. 93,194**
**Int. Cl.³ B26D 5/40**
**U.S. Cl. 83—212** **11 Claims**

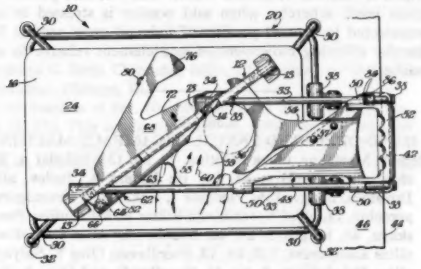


1. An apparatus for determining the desired cut length for producing wire blanks in a wire cutting machine having feed means for feeding one end of wire stock into the cutting machine, cutting means for cutting wire blanks from the wire stock and stop means for engaging the one end of the wire stock at a predetermined distance from the cutting means, comprising: means responsive to the pressure applied to the stop means by the wire stock for generating a infinitely variable blank length signal representing the magnitude of the applied pressure and means responsive to said blank length signal for controlling the feed means whereby wire blanks of a desired length are cut.

## 4,302,997
## GUARDED TOMATO SLICER

**Frank W. Jones, Greenville, and Joseph Mielnicki, Newark, both of Del., assignors to Alco Foodservice Equipment Company, Wilmington, Del.**

**Filed May 2, 1980, Ser. No. 146,354**
**Int. Cl.³ B26D *1/03, 7/22, 7/06***
**U.S. Cl. 83—425.3** **10 Claims**



1. A guarded tomato slicer comprising a flat table, a rack of parallel spaced horizontal blades having sharp edges mounted on the table, a pusher having a parallel array of planar segments for insertion in the spaces between the blades, slide means mounting the pusher on the table for movement back and forth, the slide means being disposed at shallow cutting angle relative to the mid-region of the rack of blades for movement of the pusher through the sharp edges, the pusher being constructed and arranged to urge a tomato through the sharp edges of the rack of blades for slicing it, a loading area disposed substantially between the pusher and the sharp edges of the rack of blades when the pusher is withdrawn away from the blades for receiving the tomato, a swinging gate having a vertical axis of rotation disposed in front of the loading area to shield the sharp edges of the blades as a tomato is inserted into the loading area remote from the pusher end of the swinging gate, resilient stop means reacting against the swinging gate holding it poised outwardly in front of the loading area, and the gate and pusher being short enough to clear each other when the pusher is retracted and a tomato is pushed into the loading area against and through the swinging gate with the gate disposed towards the sharp edges of the rack of blades to guard them.

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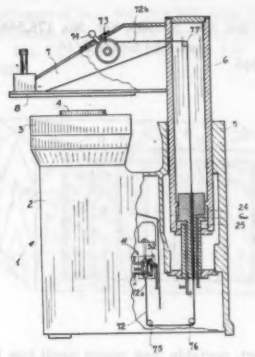
## 4,302,998
## FAST OPERATION DEVICE FOR THE HEAD IN DIE-CUTTING MACHINES, PARTICULARLY FLAG TYPE

**Emiliano Cantella, Vigevano, Italy, assignor to Atom S.p.A., Vigevano, Italy**

**Filed May 19, 1980, Ser. No. 150,943**
**Claims priority, application Italy, Jun. 29, 1979, 24019 A/79**
**Int. Cl.³ B26D *5/12***
**U.S. Cl. 83—524** **6 Claims**

1. Fast head operating device for die-cutting machines, particularly flag type, comprising a hydraulic circuit with one end connected to a feed pump and the other to two cylindrical chambers defined at the base of a column supporting the head of the die-cutting machine, said hydraulic circuit comprising a control valve, interlocked to electric operating means, equipped with a seal which slides into and is engaged in the body of the same valve to form a fluid communication between a feed conduit and a first inlet conduit, which flows into one of said cylindrical chambers for the rise of the column carrying the head of the die-cutting machine and with a second inlet conduit which flows into the other cylindrical chamber for the downstroke of the abovementioned column, characterized by the fact that it comprises a sequence valve, interposed on said first inlet conduit, a further fluid conduit branching from said second inlet conduit, immediately upstream from the respective cylindrical chamber, the latter conduit flowing into a



cylindrical chamber into which a small piston slides and is engaged, carrying, at the opposite end, the mobile contact of a pressure switch connected to said electric operating means.

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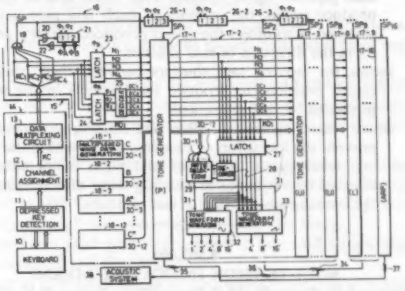
## 4,302,999
## ELECTRONIC MUSICAL INSTRUMENT

**Takatoshi Okumura, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan**

**Continuation of Ser. No. 968,860, Dec. 12, 1978, abandoned. This application Jun. 20, 1980, Ser. No. 161,222**
**Claims priority, application Japan, Dec. 14, 1977, 52-150039**
**Int. Cl.³ G10H *5/00, 7/00***
**U.S. Cl. 84—1.01** **17 Claims**



1. An electronic musical instrument comprising:

a synchronous binary counter which divides the frequency of an input basic pulse train occurring at a rate corresponding to an allotted note of the musical scale, the resultant divided binary contents of said counter being supplied serially as an output upon occurrence of successive basic pulses,

a memory storing sampled amplitudes of a waveform, and

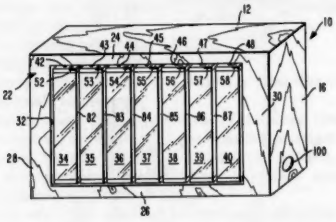
readout means, connected to said counter to receive said serially supplied binary contents and cooperating with said memory, for reading out a sampled amplitude from said memory each time that said contents are supplied, utilizing a selected subset of said supplied binary contents as the memory address for such readout, thereby to produce a waveform having the frequency of said allotted note in an octave established by the particular selected subset of contents.

4,303,000

## SWELL BOX FOR HYBRID PIPE ORGAN

Richard H. Peterson, 11748 Walnut Ridge Dr., Palos Park, Ill. 60464

Filed Aug. 5, 1980, Ser. No. 175,546
Int. Cl.³ G41O *3/16*
U.S. Cl. 84—346 8 Claims



1. A compact, portable pipe organ swell box for receiving organ pipes and for providing characteristic pipe organ sounds, comprising:

a shallow housing having closed top, bottom, side and rear walls and an open front, said walls defining an interior space which has sufficient height, width and depth to accommodate a set of organ pipes;

a plurality of shutters mounted for pivotal motion in said box and adapted to rotate between a closed position, which substantially closes the front of said housing, and an open position, which substantially opens the front of said housing;

an air chest mounted within said housing between said rear wall and said shutters;

means for supplying air under pressure to said air chest;

at least one rank of organ pipes mounted on said air chest and communicating therewith to receive pressurized air, each pipe having an opening from which said air flows to produce sound, the opening of each said pipe being so oriented as to direct the sound produced thereby primarily in the direction of said shutters;

means for moving said shutters between their open and closed positions to produce swell effects in the sounds produced by said pipes; and

sound absorbing means within said housing and located to prevent the formation of standing waves within the housing, whereby the tuning of said pipes is not adversely affected by variations in standing wave effects caused by the opening and closing of said shutters.

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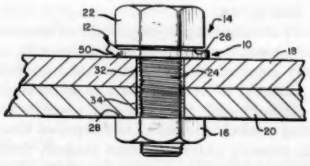
4,303,001

## BOLT TENSION INDICATING MEANS

Emanuel H. Trungold, 14-B Broun Place, Bronx, N.Y. 10475

Continuation-in-part of Ser. No. 825,558, Aug. 18, 1977, Pat. No. 4,164,164, which is a continuation-in-part of Ser. No. 704,768, Jul. 13, 1976, abandoned. This application Jul. 9, 1979, Ser. No. 55,988
Int. Cl.³ F16B *31/02*
U.S. Cl. 411—10 7 Claims



1. In a flat annular washer of the type suitable for use in cooperation with a nut or a bolt head having a given radius, the improvement which comprises means for indicating that the stress on said washer has reached a preselected level, said indicating means comprising an element joined to said washer by a portion of reduced cross section, at least a portion of said element extending a distance from the center of said washer not less than the radius of said nut or bolt head, said portion of reduced cross section having a predetermined stress failure which is reached when said washer achieves said preselected stress level, whereby when said washer is stressed to said preselected level, said portion of reduced cross section fails thereby effecting movement of said element relative to said washer.

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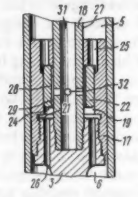
4,303,002

## HAND-OPERATED PNEUMATIC IMPACT MACHINE

Petr A. Maslakov, ulitsa Nikitina, 70, kv. 131; Nikolai A. Klushin, ulitsa Krylova, 41, kv. 10; Leonid A. Juriev, ulitsa Dovatora, 25, kv. 136; Vladimir I. Kokarev, 2 Krasnogorsky pereulok, 11, all of Novosibirsk; Viktor E. Kilin, ulitsa Posadskaya, 44, korpus 2, kv. 40, Sverdlovsk; Anas G. Galimov, ulitsa Kuibysheva, 115, kv. 13, Sverdlovsk; Oleg Y. Sutyagin, ulitsa Dekabristov, 5, kv. 31, Sverdlovsk, and Oleg A. Yankovsky, ulitsa S. Morozovoi, 175a, kv. 95, Sverdlovsk, all of U.S.S.R.

Continuation of Ser. No. 874,238, Jan. 31, 1978. This application Dec. 12, 1979, Ser. No. 103,513
Int. Cl.³ F01L *25/04, 21/02*
U.S. Cl. 91—225 3 Claims



1. A pneumatic impact machine comprised by:

a hollow body forming a cylinder having an exhaust outlet hole located intermediate the axial ends thereof; a double acting piston reciprocable within the cylinder, the piston having opposed working faces and having an annular interior distributing space, said distributing space communicating with the respective axial ends of the cylinder through channels extending from the respective working faces of the piston to said annular interior distributing space thereof; one piston rod extending from one said working face of said piston and another piston rod extending from the other of said working faces of the piston through sealing means at the respective ends of the cylinder, one of the said piston rods extending through said annular interior space and providing a conduit for the supply of compressed air to said annular interior distributing space, said conduit communicating with said annular interior distributing space through holes formed in said one piston rod at a position substantially intermediate the axial ends of said annular interior distributing space; and a change-over valve freely slidable within the annular interior space of the piston between a first position in which one axial end thereof seals and closes the channels through one of said working faces, and a second position in which an opposite axial end thereof seals and closes the channels through the other of said working faces; said valve member being comprised of a hollow cylinder having an axial bore which is of a diameter greater than that of said one piston rod to define a clearance forming an inner channel for the passage of compressed air axially within the bore of said valve, said channels in each of the respective working faces of said piston having a combined cross-sectional

area in excess of the cross-sectional area of said clearance between the valve bore and said one piston rod.

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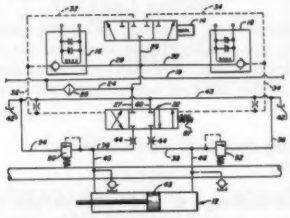
**4,303,003**
**SWITCHING VALVE**

**Raymond G. Reip, Clarendon Hills, Ill., assignor to Vapor Corporation, Chicago, Ill.**

**Continuation of Ser. No. 800,293, May 25, 1977, Pat. No. 4,220,074. This application Apr. 16, 1980, Ser. No. 141,139**
**Int. Cl.³ F15B *13/043;* F16K *25/00***
**U.S. Cl. 91—453** **1 Claim**



1. A pilot fluid operated switching valve for controlling the communication of pressurized fluid from a source of pressurized fluid to a prime mover, comprising:

a housing;

first means for communicating said housing with at least one source of pilot fluid;

second means for communicating said housing with a source of pressurized fluids;

third means for communicating said housing with said prime mover; an elongated bore defined in said housing;

passage means for communicating said first, second, and third means with said bore; and,

means mounting a pilot fluid actuated flow control member of a constant diameter for slideable motion in said bore, said flow control member responsive to said pilot fluid and including at least one pressure surface in communication with said source of pilot fluid through said passage means and said first means, said pressure surface adapted to interact with said pilot fluid to develop a flow control member actuating force, said flow control member further including at least one internal conduit for directing said pressurized fluid from said second means and said passage means to said prime mover in a first position, and terminating flow to said prime mover in a second position;

means sealing said conduit and passage means for isolating said pilot and pressurized fluids; and,

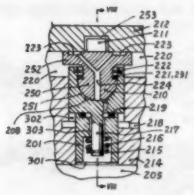
means cooperating with said mounting and sealing means for centering said flow control member in the absence of pilot fluid, thereby inhibiting pressurized fluid flow in said passage means, and locking said prime mover;

said mounting means includes a plastic infused metal plating on said flow control member surfaces, and said sealing means includes at least one sliding, one piece seal between said conduit and passage means, said seal including a means for biasing said seal into sealing engagement with said housing and said flow control member, said seal further including a concave face engaging the periphery of said flow control member to provide a low friction sliding seal.

**4,303,004**
**SNAP RING ASSEMBLY FOR TWO BODIES**

**Karl Eickmann, 2420, Isshiki, Hayama-machi, Kanagawa-ken, Japan**

**Continuation-in-part of Ser. No. 911,246, May 31, 1978. This application Feb. 21, 1979, Ser. No. 12,996**
**Int. Cl.³ F01B *13/06;* F16D *3/8***
**U.S. Cl. 91—488** **9 Claims**



4. An assembly of two bodies, including a first body, a second body, a spring ring and a snap ring,

wherein said first body is a piston reciprocating in a radial piston machine and has a hollow upper end portion forming in said endportion a seat with a seat face of a radius around a common centre whereby the said seat obtains the form of substantially a hollow half ball,

wherein said second body is a piston shoe pivotably connected to said piston and having an outer face to be guided along an actuator face for transferation of a stroke from said actuator face to said piston;

wherein said second body has an end portion in the form of substantially a half ball with a radius corresponding to said radius and around said common centre,

whereby said end portion of said second body is swingably borne on said seat of the said first body,

wherein said second body has two parallel face portions on a norrowed portion inwards of said half-ball formed end portion,

wherein said second body has between said half-ball formed end portion and said parallel face portions medial partial ends with shoulders substantially normal to said parallel face portions,

wherein said first body has an annular ring groove extending radially from inside into said end portion of said first body,

wherein said first body has at least one slot extending radially through said end portion of said first body,

wherein an axial span-ring is inserted into said hollow end portion of said first body,

wherein said span-ring is bowed under force towards said shoulders,

wherein said span-ring has at least one radially extending finger,

wherein said finger is inserted into said slot,

wherein said span-ring has a radial opening defined by two parallel ring faces,

wherein said parallel ring faces are facing said parallel faces of said second body,

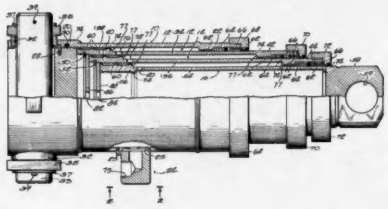
wherein a snap ring is inserted under thrust against said span-ring into said annular ring groove in said first body and wherein said span-ring is prevented from rotation relatively to said first body to said finger in said slot and rotation of said second body relatively to said span-ring is prevented by said parallel faces and the said bodies are kept together in said seat by thrust of said span-ring onto said shoulders of said second body, while the ability of relative pivot motion between said bodies remains maintained.

4,303,005

## HYDRAULIC CYLINDER ASSEMBLY

Norman J. Glomski, New Berlin, and Buddy C. Schelman, West Allis, both of Wis., assignors to The Heil Company, Milwaukee, Wis.

Filed Jul. 16, 1979, Ser. No. 57,943
Int. Cl.[3] F01B *7/20*
U.S. Cl. 92—52 4 Claims



1. A hydraulic cylinder assembly comprising:

an outer barrel having at least one internal sleeve and a center rod telescopically mounted therein, said outer barrel comprised of a tubular wall member having a bottom end tube welded to one end thereof and a packing gland tube welded to the other end thereof, said bottom end tube having an end cap removably mounted therein;

said internal sleeve comprised of a tubular wall member having an axial end of a bottom end tube butt welded to one axial end thereof and an axial end of a packing gland tube butt welded to the other axial end thereof, said axial end butt welds being the sole engagement of said internal sleeve with said bottom end tube and said packing gland tube, said bottom end tube having an end cap removably mounted therein;

said center rod comprised of a tubular wall member having a bottom end tube butt welded to one end thereof and a connection member fastened to the other end thereof;

adjustable packing gland nuts threadably mounted on said outer barrel and internal sleeve packing gland tubes;

externally extending stop shoulder means formed integrally with said end tubes of said internal sleeve and center rod, said end tubes having a wall thickness greater than the wall thickness of said tubular wall members to thereby provide said externally extending stop shoulder means, said externally extending stop shoulder means being directly at and radially about said end tube butt welds;

internally extending stop shoulder means formed integrally with said packing gland tubes of said outer barrel and internal sleeve;

wear ring means and packing gland means mounted between said telescopically arranged outer barrel, internal sleeve and center rod;

inlet fitting means mounted on said outer barrel through which hydraulic fluid can be introduced into said outer barrel;

internal passageway means inside said hydraulic cylinder assembly for facilitating flow of hydraulic fluid from said outer barrel into said internal sleeve and into said center rod;

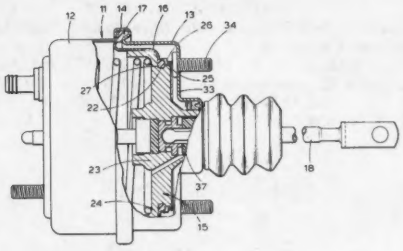
said mating surfaces of said stop shoulder means on said end tubes and packing gland tubes being angled slightly with respect to planes extending at right angles to the axis of the hydraulic cylinder assembly to thereby provide a self-aligning seating action at the mating faces of said stop shoulder means.

4,303,006

## ROLLING DIAPHRAGM APPARATUS

John P. Burke, Leamington Spa, and Alastair J. Young, Kenilworth, both of England, assignors to Automotive Products Limited, Warwickshire, England

Filed Dec. 13, 1979, Ser. No. 103,420
Claims priority, application United Kingdom, Dec. 21, 1978, 4963/78
Int. Cl.[3] F01B *11/02*
U.S. Cl. 92—85 R 4 Claims




1. A rolling diaphragm apparatus having:

a housing;

a piston;

an annular diaphragm secured by its inner and outer peripheries respectively to said piston and housing;

a bead formed on the diaphragm at one of said inner and outer peripheries and having thereon a substantially axially directed face and a substantially radially directed face;

an annular seat formed on the respective one of said piston and housing to which the bead is attached and into which the bead locates;

and a resilient retaining ring having a positive snap fit engagement with the respective seat part, said snap fit being formed by a detent on one of the ring and seat part engaging a groove in the other of the ring and seat part and the ring having corresponding faces thereon that engage with said bead faces, said ring having a portion that constitutes an annular axial projection that engages the seat part into which the ring snaps to support the ring against movement caused by loads acting on said diaphragm, said portion constituting a piston back stop means that prevents the piston from contacting the housing on retraction from an operative stroke.

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4,303,007

## CEILING AIR OUTLET FOR AIR CONDITIONING SYSTEM

Hans Riegel, Geldern, and Gerd Kurzhals, Duisburg, both of Fed. Rep. of Germany, assignors to Gebrueder Trox GmbH, Neukirchen-Vluyn, Fed. Rep. of Germany

Filed Jul. 6, 1979, Ser. No. 55,354
Claims priority, application Fed. Rep. of Germany, Jul. 6, 1978, 7820323[U]
Int. Cl.[3] F24F *13/08*
U.S. Cl. 98—40 D 6 Claims

1. An air conditioning system ceiling air outlet having a discharge surface comprising:

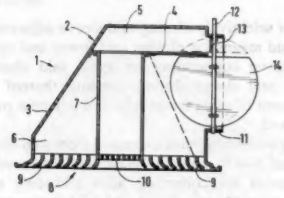
a vertically downwardly directed warm air discharge duct for vertically downward direction of warm air at said discharge surface,

a vertically downwardly directed cold air discharge duct surrounding said warm air duct and having outwardly directed blades at the discharge end thereof for substantially horizontal direction of cold air at said discharge surface,

said ducts terminating at their intake ends in a common

connecting horizontal stub having a horizontal bulkhead therein forming said stub into a top portion and a bottom portion, said top portion being in fluid communication with said warm air duct and said bottom portion being in fluid communication with said cold air duct,

covering plates for each of said portions and mounted in said connecting stub,



said covering plates being mounted on a common axis of rotation and at an angle to each other so that when one of said portions and the associated duct is closed by one of said plates, the other of said portions and its associated duct is open.

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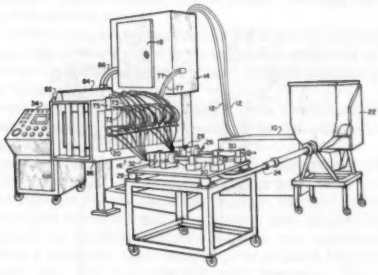
**4,303,008**

## APPARATUS FOR PRODUCING A RESTRUCTURED FOOD PRODUCT

**Jaxon O. Hice, and Gerald J. Webb, both of Charlotte, N.C., assignors to Fryday Corporation, Charlotte, N.C.**

**Filed Aug. 18, 1980, Ser. No. 169,285**
**Int. Cl.³ A47J 37/00**
**U.S. Cl. 99—353** **13 Claims**



1. Apparatus for producing a restructured food product from small pieces of said product, said apparatus comprising:

(a) means for comminuting said small pieces of said food product to form a paste having a fluent consistency;

(b) molding means having opposed surface portions that have a high thermal conductivity and that form a mold cavity therebetween;

(c) injection means for forcing said paste into said mold cavity under a high pressure until the mold is filled with said paste;

(d) operating means for maintaining said paste within said mold cavity at an elevated pressure above a predetermined level;

(e) heating means associated with said molding means for maintaining said mold-forming surface portions at an elevated temperature that is sufficient to rapidly and uniformly cook said paste while said paste remains at or exceeds said elevated pressure; and

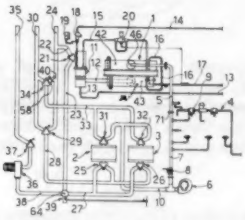
(f) means for causing said cooked product to be removed from said mold cavity.

**4,303,009**

## APPARATUS CAPABLE OF OPERATING BOTH AS NITROGEN GENERATOR AND CARBON DIOXIDE ABSORBER, PARTICULARLY FOR THE PRESERVATION UNDER CONTROLLED ATMOSPHERE OF PRODUCTS, SUCH AS FRUIT AND VEGETABLE PRODUCTS

**Gaspare La Monica, Milan, Italy, assignor to Samifi Babcock, S.p.A, Milan, Italy**

**Filed Mar. 30, 1979, Ser. No. 25,612**
**Claims priority, application Italy, Apr. 6, 1978, 22035 A/78**
**Int. Cl.³ A23B 7/00**
**U.S. Cl. 99—474** **7 Claims**



1. An apparatus capable of operating both as nitrogen generator and carbon dioxide absorber, particularly for preserving under controlled atmosphere fruit and vegetable products and the like, comprising a generator, including a reactor receiving therein a mixture of air and fuel gas, such as propane or methane gas, means for feeding said mixture to said reactor, the reactor comprising a burner space for combustion, so that gaseous combustion products exit from the reactor and comprise nitrogen and carbon dioxide, two absorbers, each suitable to retain carbon dioxide, a condenser downstream of the reactor and upstream of the absorbers having the gaseous combustion products passing therethrough, so that steam in said combustion products is condensed and claimed as water in a liquid state, means for water cooling said condenser and burner space, means for feeding the gaseous combustion products comprising nitrogen and carbon dioxide from the condenser to both absorbers, means for feeding gas exiting from either absorber to a product-containing cell or storage room, or alternatively to an exhaust or outlet, means for connecting said cell or storage room, with either absorber for supply of the cell or storage room atmosphere, means for feeding scavenging air to the absorbers, means by which when an absorber is operating to retain carbon dioxide of the gaseous volume from the burner or cell, the other absorber having scavenging air passing therethrough and vice-versa, and means for operating the apparatus only as either nitrogen generator or absorber of carbon dioxide of the cell or storage room atmosphere, said reactor comprising two parts which substantially form two opposite walls of said burner space, each of said walls comprising two opposed sheets spaced from each other and having laterally spaced indentations along a dimension thereof, the indentations being disposed on both sheets confronting each other and in contact along the full dimension defining a seal therebetween to define separate channel paths having rods inserted therein for flow of cooling water therethrough along predetermined, substantially coiled paths to maintain said walls at substantially uniform temperature distribution and to facilitate substantially smooth combustion with substantially complete elimination of flashback and a substantial reduction in the risk of failure because of uneven temperature districation, said apparatus further comprising a tube conveying the gaseous volume from either absorber, which has retained carbon dioxide, a three-way valve connected to said tube and having two tubular sections extending therefrom and respectively connected to a tube leading to an outlet, the last-mentioned tube, and a tube leading to the cell having a non-return check valve provided in the tubular section between said three-way valve and tube leading to the

stack, for allowing the passage of said gaseous volume only in the direction from said three-way valve to said tube leading to the stack.

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**4,303,010**

## REFUSE DISPOSAL SYSTEM

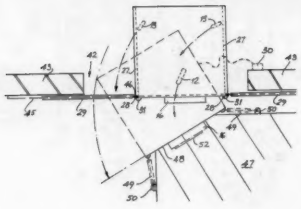
**Manus Coffey, Newtownmountkennedy, Ireland, assignor to Murco Environmental Limited, Dublin, Ireland**

**Filed May 13, 1980, Ser. No. 149,409**

**Claims priority, application Ireland, May 14, 1979, 408/79**

**Int. Cl.³ B30B *15/00***

**U.S. Cl. 100—100** **13 Claims**



**1.** A refuse disposal system comprising a mobile refuse compacting unit located in an aperture in a wall of a building, the aperture being wider than the unit, a pair of sliding doors mounted for movement parallel to the wall and disposed one on either side of the unit, and means coupling the doors to opposite sides of the unit respectively so as to permit a degree of horizontal movement of the unit in directions both parallel and perpendicular to the wall respectively and also a degree of rotational movement of the unit about a vertical axis, the doors and the unit in any position of the latter occupying substantially the full width of the aperture, and the unit having a refuse input accessible from inside the building and a refuse output accessible from outside the building.

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**4,303,011**

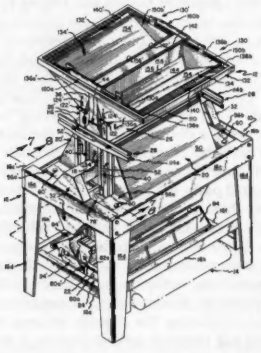
## AUTOMATIC PLATEN PRESS

**Ralph E. Reiner, R.D. 2 Chestnut Ridge Rd., Orchard Park, N.Y. 14127**

**Continuation of Ser. No. 36,062, May 4, 1979, abandoned. This application Oct. 9, 1980, Ser. No. 195,500**

**Int. Cl.³ B30B *9/06***

**U.S. Cl. 100—122** **18 Claims**



**1.** A press particularly adapted for use in extracting juice from fuit, said press comprising in combination:

a pair of vertically disposed press platens including a stationary platen and a movable platen supported for horizontal movement relative to said stationary platen between remote charging and adjacent pressing positions;

a vertically extending sleeve formed of filter cloth, said sleeve being arranged horizontally intermediate said platens and having open upper and lower ends;

means for depositing a charge of fruit to be pressed within said sleeve through said upper end;

means for selectively closing said sleeve adjacent said lower end;

means for selectively closing said sleeve adjacent said upper end, said means for closing said lower and upper ends of said sleeve cooperating to retain said charge of fruit within said sleeve during pressing thereof incident to movement of said platens into said adjacent pressing positions; and

means for collecting juice extracted from said charge of fruit disposed within said sleeve incident to pressing thereof, said means for collecting juice including a stationary trough operably associated with said stationary platen and a movable trough operably associated with said movable platen, and said means for closing said sleeve adjacent said lower end includes a stationary clamping surface and a movable clamping edge carried by said movable trough and cooperating with said clamping surface to close said sleeve.

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**4,303,012**

## LOAD MULTIPLYING MECHANISMS

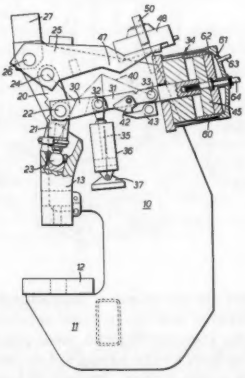
**Gordon L. McGlennon, 13, Llantwit Rd., Pontypridd, Mid-Glamorgan, Wales**

**Filed Aug. 20, 1979, Ser. No. 67,799**

**Claims priority, application United Kingdom, Aug. 26, 1978, 34762/78**

**Int. Cl.³ B30B *1/16***

**U.S. Cl. 100—272** **11 Claims**



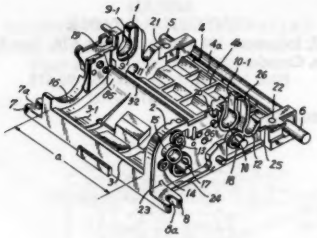
**1.** A power operated press including a frame having a base with worktable, means to support a plunger for movement towards and away from the worktable, and means for actuating the plunger including a first toggle linkage comprising two links pivotally interconnected at an articulated joint, the links being respectively connected pivotally to the frame and the plunger, and a second toggle linkage compri ing two further links pivotally interconnected at an articulated joint, one of the said further links being connected to the joint of the first toggle linkage, and including means for actuating the said toggle linkages to cause movement of said plunger and generate a potential output force thereat, including a main power-operated fluid ram acting on the second of the two links of the second toggle linkage, and a further actuator connected to the articulated joint of the said second toggle linkage.

**4,303,013**

## MICRO-PRINTER WITH UNITARY PLASTIC FRAME

**Tadayoshi Shimodaira, Shiojiri, Japan, assignor to Kabushiki Kaisha Suwa Seikosha and Shinsu Seika Kabushiki Kaisha, both of Tokyo, Japan**

**Filed Feb. 16, 1979, Ser. No. 12,780**
**Claims priority, application Japan, Feb. 16, 1978, 53-16876**
**Int. Cl.³ B41J *1/48***
**U.S. Cl. 101—99** **13 Claims**



**1.** A miniaturized printer for printing on a print tape comprising:

a one piece plastic printer frame of a given critical strength including two substantially parallel side frames spaced apart from each other a distance of the width of a print tape, said frame formed with integrally molded support means disposed between side frames for supporting said side frame, said support means including a concave shaped print tape guide member for guiding the print tape through said printer frame;

said side frame further formed with motor support means for supporting a motor within the concave region of said concave guide member and a motor mounted on said motor support means;

said motor being substantially cylindrical and further including a tape feeding drum mounted on the periphery of said motor for feeding a print tape said through said tape guide member;

at least one character ring having print characters on the periphery thereof, said ring rotatably mounted between said side frames;

character selection means for selectively aligning one of said print characters in a printing position; and

print hammer means including a print hammer pivotally mounted between said side frames and adapted to be selectively displaced between a first at rest position away from a print tape and a second print position impacting a print tape into said selected print character, the stress applied to said side frames wherein said print hammer means is mounted being within the critical strength of said plastic printer frame.

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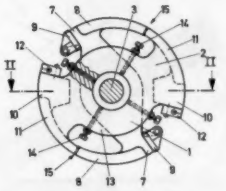
**4,303,014**

## STORAGE CYLINDER

**Willi Becker, and Arno Wirz, both of Bammental, Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Fed. Rep. of Germany**

**Filed Jun. 6, 1979, Ser. No. 46,058**
**Claims priority, application Fed. Rep. of Germany, Jun. 6, 1978, 2824733**
**Int. Cl.³ B41F *1/30***
**U.S. Cl. 101—409** **5 Claims**

**1.** In a transfer cylinder for perfector printing machines having two diametrically opposed sheet-supporting surfaces formed from two groups, respectively, of sheet supports engaging comb-like one within the other, one of the two sheet-supporting groups of one sheet-supporting surface having a device for gripping the leading edge of a sheet, and both of the sheet-supporting groups forming one sheet-supporting surface being adjustable relative to one another about the rotary shaft of the transfer cylinder, each of said sheet supports of a respective sheet-supporting surface being firmly connected to a diametrically opposing sheet support of the other sheet-supporting surface and being disposed on the shaft of the transfer



cylinder, the improvement therein comprising means for mounting together at least a plurality of the diametrically opposing, mutually firmly connected sheet supports so as to be radially adjustable, said mounting means comprising at least one radially deformable slide ring carrying said sheet supports.

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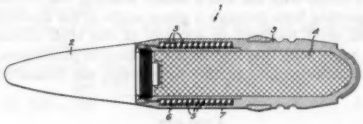
**4,303,015**

## PRE-FRAGMENTED EXPLOSIVE SHELL

**Maurice V. Bourlet, Liege, Belgium, assignor to Fabrique Nationale Herstal, en abrége F.N., Herstal, Belgium**

**Filed Feb. 15, 1980, Ser. No. 121,909**
**Claims priority, application Belgium, Feb. 28, 1979, 57634**
**Int. Cl.³ F42B *13/48***
**U.S. Cl. 102—492** **2 Claims**



**1.** Pre-fragmented explosive shell comprising a head and a body containing an explosive charge, a plurality of balls being housed in an annular space between at least a part of the wall of the body and the explosive charge, in which each of said balls consists of a core made from tungsten or tungsten carbide coated with a thin layer of zirconium.

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**4,303,016**

## ELEMENTARY CHAIR-LIFT CAB FOR TELPHER RAILWAY

**Francis Tauzin, Veyrins, France, assignor to Pomagalski S.A. and Sigma Plastique, both of, France**

**Filed Oct. 30, 1979, Ser. No. 89,343**
**Claims priority, application France, Oct. 31, 1978, 78 30863**
**Int. Cl.³ B61B *7/00***
**U.S. Cl. 104—173 ST** **4 Claims**

**1.** A chair-lift cab, for a telpher line, comprising:

(i) a hanger

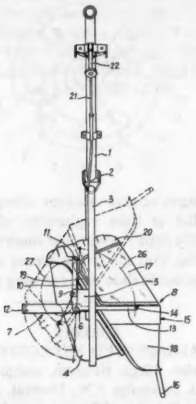
(ii) a seat frame suspended from said hanger and including a pair of spaced supports,

(iii) a seat integral with said seat frame and positioned with one of said supports at each side of the seat,

(iv) a supporting bow rearwardly encompassing said seat and including a pair of lateral arms each of which is pivotably connected to a respective one of said supports for pivoting of the bow about a first pivot axis, each said lateral arm including a portion thereof projecting forwardly of said first pivot axis,

(v) a rigid protection shell disposed in front of said seat and connected by pivot means to said forwardly projecting portions for pivoting of said shell about a transverse axis adjacent to its centre of gravity,

(vi) a pair of coupling arms disposed one at each side of said shell, each coupling arm having one end pivotably connected to a respective support for movement about a second pivot axis, each coupling arm having its other end pivotably connected to an upper part of the protection shell,



whereby the shell is movable between an opened position, in which it is moved away from the front of the seat to permit ingress and exiting of passengers, and a closed position in which it forms with the seat a closed housing, the rotation of the supporting bow through a given angle in the direction to open the shell resulting in rotation of the shell through a greater angle such that ingress and exiting of passengers, and fitting of cabs one into another for storage, are facilitated.

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**4,303,017**

## LONG STATOR LINEAR MOTOR WITHOUT IRON

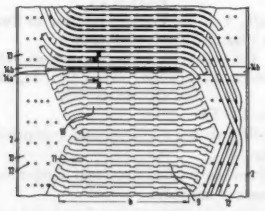
**Hans-Jürgen Düll, Langensendelbach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed May 2, 1979, Ser. No. 35,343**

**Claims priority, application Fed. Rep. of Germany, May 12, 1978, 2820888**

**Int. Cl.³ H02K *41/02*; B61B *13/00***

**U.S. Cl. 104—294** **12 Claims**



**1**. A linear motor stator adapted to be disposed on a track and to cooperate with a vehicle containing an excitation winding comprising:

(a) a form for the stator for defining a space having a preselected cross-sectional configuration suitable for placement on a track roadbed;

(b) a plurality of electrically conductive lines, each such line having at least one electrically conductive element surrounded by an insulating jacket;

(c) non-magnetic retention means in said form for fixing each of said lines individually within said space defined by said form in a position which produces a substantially flat traveling wave stator winding, portions of each of said lines being disposed adjacent and parallel to a surface plane of said form; and

(d) a non-magnetic material which is poured while in a fluid state into said form so as to occupy the remaining space defined therein, and which hardens to further fix said lines in said position fixed by said retention means.

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**4,303,018**

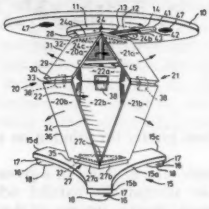
## CONVERTIBLE TABLE

**Edmund J. Lehmann, 481 Huron St., Box 576, New Hamburg, Ontario, Canada (N0B 2G0)**

**Filed Nov. 29, 1979, Ser. No. 98,675**

**Int. Cl.³ A47B *9/00***

**U.S. Cl. 108—12** **9 Claims**



**1**. A table having a variable height and comprising a table top; a base member; a table leg interposed between said base member and said table top and supporting said table top, said table leg comprising at least three outwardly collapsible walls, each of said walls including an upper panel having upper and lower ends and a lower panel having upper and lower ends; pivotally connecting said lower end of each of said upper panels and said upper end of each of said lower panels; means pivotally connecting said upper end of each of said upper panels to said table top and said lower end of each of said lower panels to said base member; means biasing each pair of upper and lower panels into alignment with each other, whereby each said pair forms a rigid but collapsible vertical table top supporting wall; and means for moving at least one panel of each of the pairs of upper and lower panels outwardly against the force of said biasing means to permit said walls to collapse outwardly away from each other whereby said table top may be moved from a higher to a low position.

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**4,303,019**

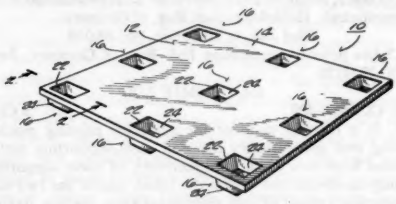
## ARTICLES MOLDED FROM PAPERMILL SLUDGE

**Bruce A. Haataja, Lake Linden, and Anders E. Lund, Houghton, both of Mich., assignors to Board of Control of Michigan Technological University, Houghton, Mich.**

**Division of Ser. No. 18,121, Mar. 7, 1979, Pat. No. 4,221,751. This application Feb. 7, 1980, Ser. No. 119,448**

**Int. Cl.³ B65D *19/24***

**U.S. Cl. 108—51.1** **8 Claims**



**1**. An article having a major plane and integral non-planar

portions displaced from said major plane compression molded from a mixture including about 25 to about 75 weight % of a comminuted papermill sludge containing about 20 weight % or less moisture, about 25 to about 75 weight % of a fibrous, cellulosic, reinforcing material and a resinous particle board binder, said weight percentages being based on the total dry weight of the papermill sludge and the cellulosic material.

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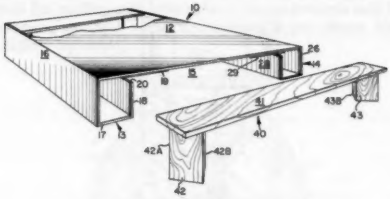
**4,303,020**

## REINFORCED FIBERBOARD PALLET

**Rene C. Houle, 11 Salem Dr., North Providence, R.I. 02904**

**Filed Jun. 14, 1979, Ser. No. 48,766**
**Int. Cl.³ B65D *19/34***
**U.S. Cl. 108—51.3** **4 Claims**



1. A portable materials handling accessory adapted for use in lift truck operations consisting essentially of a single fiberboard sheet having a central panel forming an elevated platform and having side portions, integral with said central panel, folded under said central panel to provide two hollow sleeves extending beneath and on opposite sides of said platform and defining a passageway for a lift truck fork entry beneath said platform, bridge structure means including a bridge board, longitudinal openings in said two hollow sleeves adapted to receive said bridge board, said bridge board supporting one end of said platform, and provided with two footings, one attached to each end of said bridge board and located respectively, one in each sleeve to place said platform in stress, and a second bridge structure means including a bridge board, second longitudinal openings in said two hollow sleeves adapted to receive said second bridge board, said second bridge board supporting the opposite end of said platform, said second bridge board having two footings, one attached to each end thereof, and located, respectively, one in each sleeve to place said platform in suspension and under stress.

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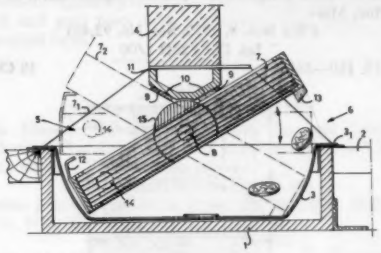
**4,303,021**

## MONEY PASSING DEVICE IN PARTICULAR FOR BANKS, STATIONS OR DEPARTMENTAL STORES

**Claude P. Bourlier, 3 rue J.F. Belbeoch, 94410 Saint Maurice, and Louis E. Sallot, 9 rue du General Leclerc, 92270 Bois Colombes, both of France**

**Filed Feb. 12, 1980, Ser. No. 120,942**
**Claims priority, application France, Feb. 16, 1979, 79 03961**
**Int. Cl.³ E05G *7/00*; E06B *9/00***
**U.S. Cl. 109—19** **9 Claims**

1. A money passing device comprising a counter, a partition wall partitioning an official off from the public and defining an opening between the partition wall and the top of the counter, a bowl inserted in the counter and fictitiously divided into two parts by an extension of the partition wall, a shutter having dimensions which are slightly less than the dimensions of an upper side of the bowl, the shutter being mounted to be pivotable relative to the partition wall about an axis which substantially coincides with the median plane of the partition wall, said axis being located slightly above the bowl in such position that the shutter covers the bowl and closes said opening in any position of the shutter, end-of-travel abutments co-operative with the shutter for limiting the angular movements of the shutter whereby the shutter uncovers alternately one of said



two parts of the bowl while it closes the other opposite part of the bowl.

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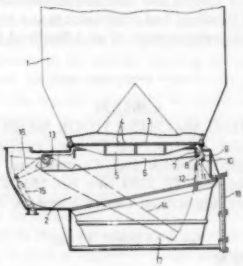
**4,303,022**

## ARRANGEMENT IN INCINERATOR

**Hermann Etnestad, Blomsterveien, and Sverre Laugerud, Moreneveien, both of Norway, assignors to O. Mustad & Son, Gjovik, Norway**

**Continuation of Ser. No. 12,750, Feb. 16, 1979, abandoned. This application Nov. 17, 1980, Ser. No. 207,730**
**Claims priority, application Norway, Feb. 17, 1978, 780551**
**Int. Cl.³ F23G *5/00*; F23L *17/00***
**U.S. Cl. 110—245** **3 Claims**



1. A fluidized bed incinerator comprising:

a combustion chamber, including a constriction plate forming the bottom of the combustion chamber;

a windbox for supplying fluidizing gas through said constriction plate to said fluidized bed;

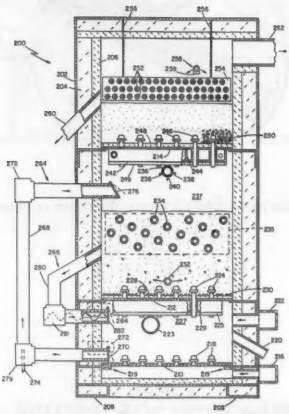
said constriction plate supporting the material forming said fluidized bed when said fluidizing gas is shut off and preventing substantially all of said bed material from entering said windbox during normal operation of said incinerator; and

emptying means for rapidly emptying said bed into said windbox including a pivotal mounting on one end of said constriction plate permitting rotation of said plate about said mounting into said windbox; and releasable locking means including a lug mounted on said plate at the opposite end from the pivotal mounting and a rotatable cam interacting with said lug for normally supporting the opposite end of said plate.

## 4,303,023
## FLUIDIZED BED FUEL BURNING

**Stephen P. Perkins, Rowley, and Alex F. Wormser, Marblehead, both of Mass., assignors to Wormser Engineering, Inc., Middleton, Mass.**

**Filed Nov. 8, 1979, Ser. No. 92,491**
**Int. Cl.³ F23D *1/00***
**U.S. Cl. 110—347** **18 Claims**



**1.** A method of burning and desulfurizing fuel which comprises

introducing said fuel and air or oxygen into a slow fluidized bed combustor containing an inert matrix material to provide burning therein, and

moving the products of combustion from said fluidized bed combustor into a second fluidized bed treatment zone containing a second and different desulfurizing matrix,

in which said fluidized bed combustor is at a higher temperature than the temperature of said fluidized bed treatment zone.

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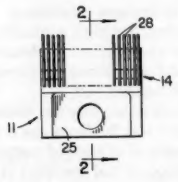
## 4,303,024
## TUFTING MACHINE HOOK MODULE

**Harold B. Bardsley, Euxton, Near Chorley, England, assignor to Spencer Wright Industries, Inc., Chattanooga, Tenn.**

**Filed May 27, 1980, Ser. No. 153,727**
**Claims priority, application United Kingdom, Apr. 26, 1980, 13847/80**
**Int. Cl.³ D05C *15/00***
**U.S. Cl. 112—79 R** **2 Claims**




**1.** A hook module for a tufting machine comprising, a body member, a first and a second series of hooks each having a shank including a mounting portion, and a blade extending from said shank defining a throat therebetween and terminating at a bill, the bills of said first series of hooks being longer than those of said second series of hooks, the mounting portions of all of said hooks being fixedely cast in said body member in spaced side-by-side disposition and having all of said throats transversely aligned, the hooks of said first series being disposed intermediate the hooks of said second series, whereby the bills of said first series of hooks extend beyond the hooks of said second series of hooks, and all of said hooks may be ground as a unit.

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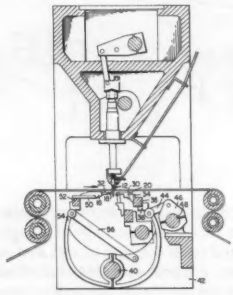
## 4,303,025
## TUFTING MECHANISM FOR FORMING LOW PILE

**Harold B. Bardsley, near Chorley, England, assignor to Spencer Wright Industries, Inc., Chattanooga, Tenn.**

**Filed Dec. 3, 1980, Ser. No. 212,316**
**Claims priority, application United Kingdom, Dec. 14, 1979, 43249/79**
**Int. Cl.³ D05C *15/00***
**U.S. Cl. 112—79 R** **11 Claims**



**1.** In a tufting machine, means including spaced fingers for supporting a moving backing material, a yarn-carrying needle supported on one side of said backing material, means for reciprocating the needle for penetrating the backing material and forming loops therein, a hook disposed on the opposite side of said backing material from said needle, and means for oscillating said hook toward and away from the path of said needle in timed relationship with the needle reciprocation for seizing said loops in succession, wherein the improvement comprises, means for oscillating said fingers in timed relationship with said hook from a disposition in the path of needle reciprocation for supporting said material during penetration thereof to a disposition withdrawn from said path as said hook moves toward said path.

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## 4,303,026
## SEAMING METHOD AND APPARATUS FOR GORED PANTY-HOSE

**Toshiharu Ueda, Yamatotakada, Japan, assignor to Takatori Machinery Works Ltd., Japan**

**Filed Nov. 24, 1978, Ser. No. 963,266**
**Int. Cl.³ D05B *21/00***
**U.S. Cl. 112—121.15** **12 Claims**

**1.** Improved seaming apparatus for gore panty-hoses comprising

a circular guide rail having at least a setting station, a slicing station, a first seaming station, a second seaming station and a removing station for a pair of stocking materials, respectively,

an annular carrier travelling along said guide rail,

a plurality of template assemblies mounted on said carrier at prescribed intervals from each other and each having a pair of horizontally spaced turnable template units each of which has three sets of vertically superimposed nipping templates adapted for receiving said stocking materials at said setting station,

means for placing said three nipping templates into neat

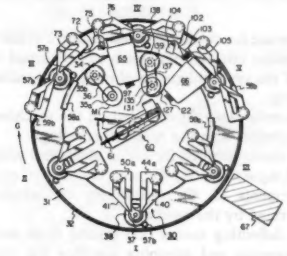
pressure contact with each other in order to nip said stocking materials,

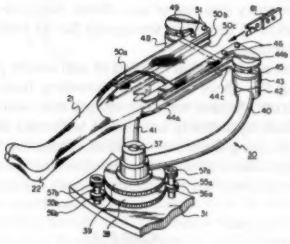
a cutter device arranged at said slicing station and having a cutter which slices said stocking materials in the nipped disposition at a position intermediate of said pair of template units to the thigh portion in order to form upper and lower sliced fringes on said stocking materials,

first means for turning said template units from a mutually parallel angular posture at said slicing station to a mutually aligned angular posture with free ends thereof confronting to each other in order to expose said upper and lower sliced fringes outside the interior of said stocking materials and make same assume a substantially straight form,

a first sewing machine arranged at said first seaming station and having a first seaming position,

first means arranged upstreamly of said first sewing machine and for guiding said lower sliced fringe towards said first seaming position while folding said upper sliced fringe slightly upwards,





means accompanying said first guiding means and for feeding a rhombic gore piece towards said first seaming position,

first means for adjusting the arched center portion of said lower sliced fringe to meet the corresponding one fringe of said gore piece in advance to seaming of said center portion to said one fringe by said first sewing machine,

first means for detecting correct passage of said lower sliced fringe and generating a signal to be passed to said first adjusting means when said lower sliced fringe assumes incorrect path of travel.

a second sewing machine arranged at said second seaming station and having a second seaming position,

second means arranged upstreamly of said second sewing machine and for guiding said upper sliced fringe towards said second seaming position after returning same to the horizontal state while folding said center portion of said lower sliced fringe downwards,

second means for adjusting said upper sliced fringe to meet the other fringe of said gore piece in advance to seaming of said upper sliced fringe to said other fringe by said second sewing machine,

second means for detecting correct passage of said upper sliced fringe and generating a signal to be passed to said second adjusting means when said upper sliced fringe assumes incorrect path of travel, and

means for regulating the seaming line of said the other fringe of said gore piece with said upper sliced fringe to an arched form.

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**4,303,027**

## CLOTH FEEDING APPARATUS

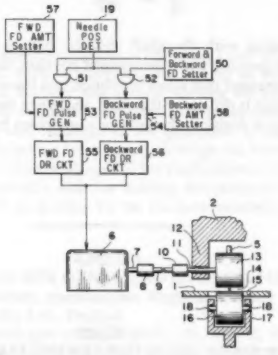
**Tamio Uemura, Kawasaki; Yoshimasa Ito, and Takahiro Itakura, both of Yokohama, all of Japan, assignors to Tokico, Ltd., Kanagawa, Japan**

**Filed Jul. 3, 1979, Ser. No. 54,594**

**Claims priority, application Japan, Jul. 10, 1978, 53-83752; Jul. 10, 1978, 53-83753**

**Int. Cl.³ D05B *27/14, 27/16***

**U.S. Cl. 112—121.26** **11 Claims**


FWD FD AMT Setter
Needle POS DET
Forward & Backward FD Setter
FWD FD Pulse GEN
Backward FD Pulse GEN
Backward FD AMT Setter
FWD FD DR CKT
Backward FD DR CKT

1. A cloth feeding apparatus, comprising first and second feeding devices capable of forward and backward feeding, wherein said first feeding device comprises a rotator provided on the downstream to the second feeding device with respect to the forward feeding direction for feeding the cloth in contact therewith, a pulse generator for generating a series of pulses corresponding to the cloth feeding amount in response to the withdrawal, from the cloth, of a needle provided reciprocally movably so as to stitch the cloth on a bed, a step motor actuated by the series of pulses from the pulse generator, said step motor causing said rotator to rotate, and a feeding amount setter adapted to determine the number of the pulses in said series issued from the pulse generator, upon the forward feeding operation, in such a manner that the feeding amount of the rotator is greater than the feeding amount of the second feeding device provided on the upstream to the rotator with respect to the forward feeding direction, whereby the cloth is fed under tension during forward cloth feeding.

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**4,303,028**

## SEWING MACHINE WITH NEEDLE DROPPING HOLE CHANGING CONTROL SYSTEM

**Hideaki Takenoya, Hachioji, and Hachiro Makabe, Fussa, both of Japan, assignors to Janome Sewing Machine Co., Ltd., Tokyo, Japan**

**Filed Jan. 26, 1979, Ser. No. 6,684**

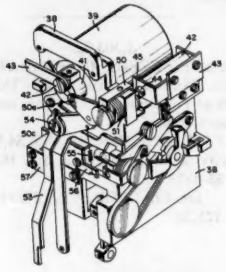
**Claims priority, application Japan, Jan. 26, 1978, 53-7680; Jul. 3, 1978, 53-90477[U]; Oct. 26, 1978, 53-131014**

**Int. Cl.³ D05B *3/02***

**U.S. Cl. 112—158 E** **3 Claims**

1. An improvement to a sewing machine in which at least two mechanical machine functions are to be made consistent with each other, namely lateral needle movement and needle hole size adjustment, the improvement comprising: a single

pulse motor with an output shaft; a mechanical linkage which can be driven by the output shaft and which is connected in a manner that at least two mechanical functions are made consistent with each other when the linkage is so driven; and a clutch



cooperating with the shaft and the linkage and having an engaged position and a disengaged position, the clutch operating in a manner that when the clutch is in the engaged position, the linkage is driven by the shaft, and when the clutch is in the disengaged position, the linkage is undriven by the shaft.

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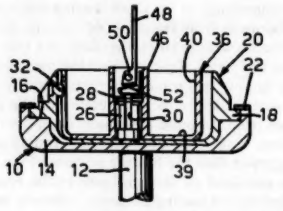
**4,303,029**

## ROTARY HOOK FOR SEWING MACHINE

**Nereo Bianchi, Pavia, Italy, assignor to Necchi Societa per Azioni, Pavia, Italy**

**Filed Aug. 27, 1979, Ser. No. 69,988**
**Claims priority, application Italy, Sep. 25, 1978, 42913 A/78**
**Int. Cl.³ D05B *57/26***
**U.S. Cl. 112—231** **3 Claims**



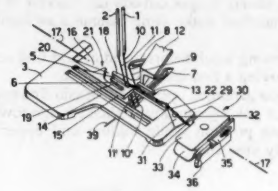
1. A hook for a sewing machine comprising a hook body, a bobbin case holder arranged in said hook body, a bobbin case arranged in said bobbin case holder, a bobbin in said bobbin case, said bobbin case holder having a bottom wall from which extends a pin, said pin defining an upper portion of greater diameter than the remainder of the pin and having slits therein extending longitudinally for a large portion of the length of the pin, a hollow pin extending centrally from a bottom wall portion of said bobbin case defining a hole therein having two different diameters suitable to provide together with said pin of said bobbin case holder a locking system to lock said bobbin case to the said bobbin case holder, and lever means positioned in said hole to ensure locking of said bobbin in the bobbin case during sewing and to facilitate removal and insertion of the bobbin case from and in the bobbin case holder when bobbin change is requested.

**4,303,030**

## DEVICE FOR CONTROLLING STITCH CHAINS IN SEWING MACHINES HAVING A PLURALITY OF NEEDLES

**Giovanni Palacino, Via dei Giacinti 12, and Angelo Radice, Largo Promessi Sposi 7, both of Milan, Italy**

**Filed Jul. 25, 1980, Ser. No. 172,054**
**Claims priority, application Italy, Sep. 20, 1979, 25840 A/79**
**Int. Cl.³ D05B *65/02, 53/00***
**U.S. Cl. 112—286** **5 Claims**



1. A device for cutting and restraining a chain of stitches for incorporation into the next seam to be formed in sewing machines of the type utilizing a plurality of needles, said device comprising:

(a) a needle plate (3) mounted on the machine in operative association with the needles including:

(i) a throat element for and in alignment with each needle;

(ii) tongues (18, 19) forming one side of each said throat elements (5, 6) respectively on which stitches are formed by the needles;

(iii) deflecting means (21) spaced from said tongues for engaging and grouping together the chains removed from said tongues upon completion of the sewing cycle;

(iv) camming means (27) forming one side of said deflecting means for guiding the grouped threads to a position for entry into one of said throat elements upon manipulation of the sewn workpiece for its removal from the machine;

(v) means formed at one end of said needle plate for aligning the chain of stitches extending from the one said throat element with the sewing axis; and

(b) means operatively associated with said aligning means for severing the sewn workpiece from the chain; and

(c) means attached to said severing means for restraining the severed chain for incorporation into the next seam.

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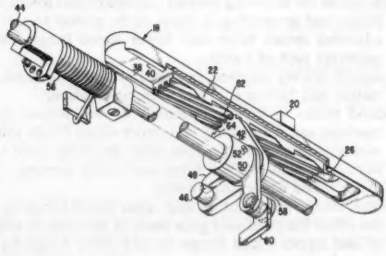
**4,303,031**

## LINEAR FEED REGULATING CONTROL FOR A SEWING MACHINE

**Thomas G. Graham, Emerson, N.J., assignor to The Singer Company, Stamford, Conn.**

**Filed Apr. 28, 1980, Ser. No. 144,004**
**Int. Cl.³ D05B *27/22***
**U.S. Cl. 112—316** **9 Claims**



1. In a sewing machine, stitch length control mechanism

including a linearly movable input control member, a linearly translatable gear rack selectively positionable by the input member, a gear sector positionable by the gear rack about an axis of rotation extending substantially parallel to the direction of linear translation of the gear rack, and a feed regulator shaft positionable by the gear sector, the gear rack and gear sector having meshing helical gear teeth extending relative to the axis of the gear sector at an angle effective to prevent dislodgement of the gear rack, gear sector and feed regulator shaft from selected positions with the application of less than a predetermined torque to the feed regulator shaft.

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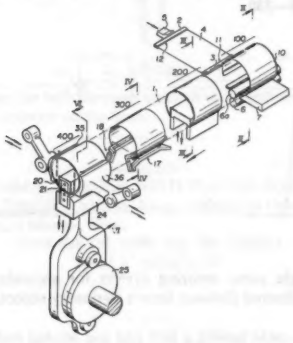
**4,303,032**

## PROCESS FOR FORMING CAN BODIES

**Yuzo Takahashi; Yoshinari Maeda; Yasuyuki Tanaka; Kastumi Nagai, and Shiro Oyama, all of Iwatsuki, Japan, assignors to Hokkai Can Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 14,619, Feb. 23, 1979, Pat. No. 4,226,201. This application Apr. 3, 1980, Ser. No. 136,489**
**Claims priority, application Japan, Mar. 14, 1978, 53-29435**
**Int. Cl.³ B21D *51/26***
**U.S. Cl. 113—116 QA** **1 Claim**



1. A process for forming a can body comprising:

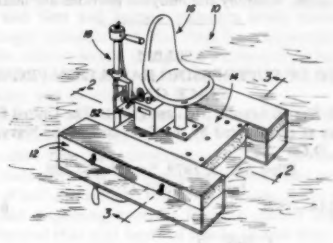
forming into a roughly cylindrical shape a can body blank having the opposite ends thereof coated with adhesive films of thermoplastic organic polymer under the guidance of a cylinder kept at an atmospheric temperature, bending inwardly said opposite ends into flat ends, transferring the thus formed can body blank along said cylinder to a succeeding position, melting by high-frequency induction heating said adhesive films coated on said opposite ends of said blank placed at said succeeding section while avoiding overheating the corner portions of said blank, transferring said blank to one end of said cylinder while said adhesive films are in a melted state, placing said can body blank in a can body contact-bonding section defined by said one end of said cylinder and a pair of pushing members which are moved oppositely to and from each other laterally of said cylinder, forming said roughly formed can body blank into a predetermined cylinder under the guidance of the outer periphery of said one end of said cylinder by the closing motions of said pushing members in such a manner that said flat opposite ends are lapped one on the other, cooling and bonding said adhesive films by striking in a spline portion in the lower part of said one end of said cylinder the thus lapped ends by a hammer having only its striking part cooled against a cooling and pressure-receiving part which exerts its cooling action only externally radially with said cylinder not otherwise being substantially cooled throughout its length except by room air, and retaining the thus struck state of said lapped ends for cooling and curing said melted adhesive films to complete a can body.

**4,303,033**

## PORTABLE PONTOON BOAT

**Gary D. King, Rte. #1, Box 192A, Mound Valley, Kans. 67354**

**Filed Nov. 30, 1979, Ser. No. 99,212**
**Int. Cl.³ B63B *7/04***
**U.S. Cl. 114—61** **8 Claims**



1. A knock-down pontoon boat, comprising a pair of parallel spaced pontoons, each of said pontoons having an elongated body of flotation material and a rigid housing enclosing the flotation material, a platform member having depending side flanges abutting said housings of the pontoons, at least two assembly rods extending transversely through the housings of the pontoons and the side flanges of the platform and releasable means on the assembly rods for holding the pontoons assembled spaced from each other by the platform member.

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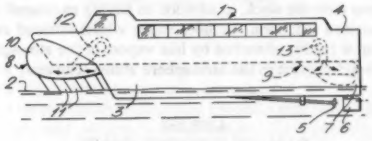
**4,303,034**

## VEHICLES FOR OPERATING OVER WATER

**Edward G. Tattersall, Southampton, England, assignor to Vosper Hovermarine Ltd., England**

**Continuation-in-part of Ser. No. 902,186, May 2, 1978, abandoned. This application Jun. 10, 1980, Ser. No. 158,099**
**Claims priority, application United Kingdom, Jul. 8, 1977, 28658/77**
**Int. Cl.³ B63B *1/34***
**U.S. Cl. 114—67 A** **7 Claims**



1. A sidewall gas-cushion marine vehicle, comprising:

a vehicle body having laterally spaced sidewalls extending longitudinally along the sides of the vehicle body and depending therefrom, the sidewalls having bottoms which, in use, extend into the water;

movable buoyancy members, each comprising a buoyant portion capable of displacing a relatively large volume of water and a web support portion capable of displacing only a relatively little volume of water, each of the buoyant portions defining relatively wide surfaces extending laterally from the web portions, said surfaces being substantially horizontal in fully submerged operative positions;

means pivotally connecting said web support portions adjacent the bottoms of the sidewalls of said vehicle, the buoyancy members being movable about axes extending substantially parallel to the longitudinal axis of the vehicle;

means for lowering the buoyant portions of the members into said fully submerged operative positions extending below the sidewalls for low speed operation, whereby sufficient hydrostatic forces are applied to the fully sub-

merged buoyant portions of the buoyancy members during said low speed operation to provide buoyancy lift for the vehicle and to counter unwanted movements of the vehicle; and,

means for raising said buoyancy members into inoperative retracted positions alongside the sidewalls for high speed operation, whereby the buoyant portions are ineffective.

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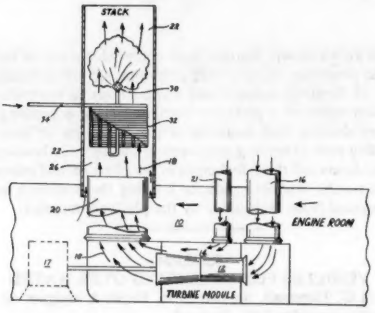
**4,303,035**

## METHOD OF SUPPRESSING RADIATION FROM SHIP STACK GASES

**Robert H. Burns, Arnold, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 3, 1979, Ser. No. 27,709**
**Int. Cl.³ B63B *15/00***
**U.S. Cl. 114—187** **6 Claims**




1. A method of reducing infrared radiation of combustion effluents from atop a ship's stack by:

spraying water preheated to near 100° C. into the stack;

whereby water droplets, already at a temperature for quickly absorbing their heat of vaporization from their surroundings, become vapor and the effluent discharging from atop the stack, in addition to having an overall temperature reduction, includes vapor whose infrared radiation is readily absorbed by like vapors in the atmosphere always present in the atmosphere above seawater.

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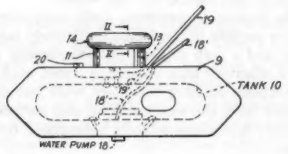
**4,303,036**

## DAMAGE CONTROL CRAFT

**John P. Stanley, Jr., 67 Wandell Ave., Staten Island, N.Y. 10304**

**Filed Mar. 3, 1980, Ser. No. 126,536**
**Int. Cl.³ B63B *43/16***
**U.S. Cl. 114—227** **2 Claims**




1. A damage control craft for plugging a hole in the bottom of the hull of a sea vessel below the water line, said sea vessel having a hull damaged due to a hole in the bottom of the hull below the water line, said damage control craft comprising

a container having an air tank therein occupying some of the space in said container;

a projecting part extending from the container and having an open end coupled to the air tank via an air duct;

a hole-filling member mounted at the open end of the projecting part;

a pump in said container for selectively pumping seawater into said container and out of said container for maneuvering said container beneath the hull of a damaged sea vessel to position the hole-filling member of said projecting part in a hole in the bottom of said hull;

pump energizing means for energizing said pump; and

compressed air supply means for supplying air to said air tank to control the buoyancy of said container and for expanding said hole-filling member in said hole in said hull to plug said hole.

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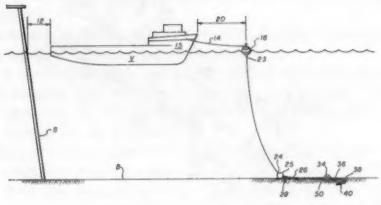
**4,303,037**

## SINGLE POINT MOORING SYSTEM

**Wilton L. Helveston, and Richard J. Pecoraro, both of New Iberia, La., assignors to International Moorings & Marine, Inc., New Iberia, La.**

**Filed Feb. 26, 1979, Ser. No. 15,417**
**Int. Cl.³ B63B *21/00***
**U.S. Cl. 114—230** **1 Claim**




1. A single point mooring system for securely mooring vessels at a desired distance from a stationary object, comprising:

(a) a first cable having a first end and second end, the first end being connected to a powered winch aboard the vessel;

(b) a buoy affixed to the second end of the first cable;

(c) a second cable having a first end and second end, the first end being universally pivotally connected to the buoy;

(d) a first sinker ball means pivotally connected to the second end of the second cable means, said first sinker ball means positioned on the ocean floor;

(e) a chain having a first and second ends, said first end being pivotally connected to the second end of the second cable and first sinker ball means;

(f) a second sinker ball means, pivotally connected to the second end of the chain;

(g) an anchor, having a shaft pivotally and axially rotatably connected to the second end of the chain, said anchor further having a plurality of blades obliquely oriented with respect to the shafts so as to readily engage the ocean floor when dragged thereupon towards the vessel.

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**4,303,038**

## TEAT CUP WITH AIR INLET

**Duncan M. Thompson, Warrenville; Harold V. Swanson, Downers Grove, both of Ill., and Lawrence J. Coombs, Bath, England, assignors to Babson Bros. Co., Oak Brook, Ill.**

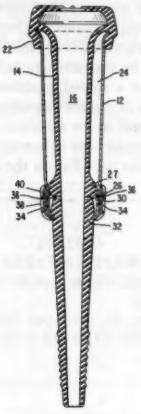
**Filed Feb. 21, 1980, Ser. No. 123,123**
**Int. Cl.³ A01J *5/04***
**U.S. Cl. 119—14.36** **15 Claims**

8. In a double-action teat cup assembly having a rigid shell sealed to a flexible liner forming an annular inflation chamber therebetween, an improved air inlet, comprising:

means sealing the outer surface of the liner to the inner

surface of the shell to define a chamber therebetween beneath the annular inflation chamber;

at least one air inlet through the shell wall to said chamber; and



at least one air inlet through the liner wall from said chamber to the interior of the liner.

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**4,303,039**

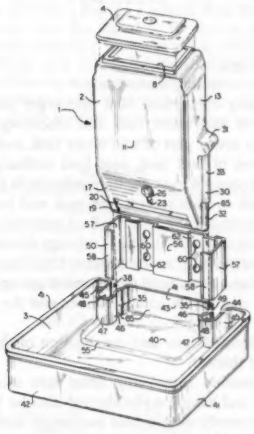
**ANIMAL FEEDER WITH FLUTED JOINT**

**Ronald M. Thibault, Osborne, Kans., assignor to Osborne Industries, Inc., Osborne, Kans.**

**Filed Feb. 29, 1980, Ser. No. 125,831**

**Int. Cl.³ A01K *5/00***

**U.S. Cl. 119—52 R** **12 Claims**



**1.** An apparatus for distributing feed to animals comprising

(a) a bin for storage of the feed; said bin having opposing side walls and at a lower end thereof a dispensing aperture through which the feed flows; said aperture having a top edge; said bin adapted to contain therein a feed displaying a certain angle of repose;

(b) an animal feeding trough positioned below and near said trough; said trough including a floor surface having a front wall, a back wall and opposing side walls extending upwardly therefrom;

(c) connector means for securly joining said bin and said trough, said connector means comprising a fluted joint including:

(1) a first member provided with said bin; said first member comprising two parallel ribs disposed on opposite side walls of said bin respectively;

(2) a second member provided with said trough comprising two spaced apart parallel grooves;

(3) said first and second members being slidably and snugly mateable such that there is no movement of said ribs relative to said grooves in a direction perpendicular to the direction in which said ribs and said grooves mate; and including:

(d) a containment wall extending upwardly from said trough floor surface, spaced apart from said trough walls and circumscribing and cooperating with said bin dispensing aperture such that a line passing between any point on a top of said containment wall and any point on the top edge of said dispensing aperture forms a smaller angle with horizontal than said angle of repose of said feed.

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**4,303,040**

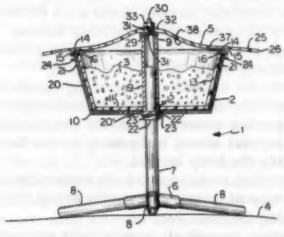
**PROTECTED FEEDER FOR LIVESTOCK**

**Fred W. Mann, Box 444, Waterville, Kans. 66549**

**Filed May 2, 1980, Ser. No. 146,127**

**Int. Cl.³ A01K *5/00***

**U.S. Cl. 119—62** **15 Claims**



**1.** A protected feeder for livestock comprising:

(a) a support structure;

(b) a receptacle having an open top and a side wall with a top edge; said receptacle being adapted for supporting livestock attracting material therein, said open top being of a size permitting livestock to have access therethrough to the attracting material in said receptacle; said receptacle being supported by said support structure;

(c) a flexible cover member mounted on said support structure in covering relation to the open top of said receptacle with a central portion at a level above the level of said top edge and having a marginal portion engaging the top edge of the receptacle and extending substantially outwardly thereof, whereby livestock are allowed to gain access thereto by upwardly flexing said cover member;

(d) means for controlling any sagging tendency of said cover member; said means being supported by said support structure and having engagement with said cover member;

(e) said cover member being circular and of substantially uniform thickness;

(f) said cover member being centrally mounted on said support structure and radiating outwardly therefrom; and

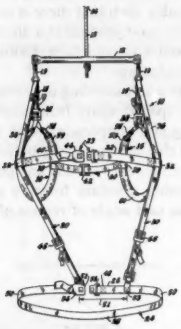
(g) said means for controlling sagging tendency of said cover member comprises an inherent characteristic of said cover member to be partially self supporting.

**4,303,041**

## SUPPORTIVE BODY HARNESS

**William P. Thompson, 6315 Scatterfield Rd., Anderson, Ind. 46011, and James M. Stelle, 2904 Fairview St., Anderson, Ind. 46014**

**Filed Apr. 9, 1980, Ser. No. 138,498**
**Int. Cl.³ A62B *35/00***
**U.S. Cl. 119—96** **15 Claims**



1. A supportive body harness, such as may be used for supporting a human body in conjunction with a checked-release means having continuous upward pull and thus imparting a continuous upward pull through the body harness, comprising, in combination:

an uppermost support means for supporting connection to associated overhead support means at an elevation above the head of the person using the body harness;

shoulder support means for supporting the person's shoulders by passing under his or her armpits;

support means for operatively supporting the shoulder support means from the uppermost support means;

a back supporting means operatively interconnecting the shoulder support means, and passing across the back of a person using the body harness;

a front supporting means operatively interconnected to the shoulder support means, and passing across the chest of a person using the body harness;

supporting strips operatively supportingly connected to the uppermost support means;

a buttocks-support means having a forward supporting portion crossing the front of the person using the body harness in the general front body area above the person's pelvis but below the person's navel;

the buttocks-support means also having a rearward supporting portion crossing the rear of the legs of the person using the body harness in the area just below the person's buttocks;

the supporting strips being operatively supportingly connected to the buttocks-support means;

the support of the shoulder-support means and the buttocks-support means being from the uppermost support means but in an inter-related manner by co-ordinating means as set forth below;

co-ordinating means operatively but movably connected to both the supporting strips which are connected to the buttocks-support means and to forward portions of the shoulder support means, the co-ordinating means achieving the plurality of factors of (a) maintaining the upper portions of the supporting strips, which are supportingly connected to the buttocks-support means, spaced laterally outwardly away from the head of the person using the body harness, and (b) operatively supportingly interconnecting the said buttocks-support supporting strips and thus also the user's buttocks-support means to the shoulder support means for achievement of a comfort-enhancing load-sharing or load-spreading as between the shoulder support means and the buttocks-support means, and (c) assuring that buttocks-support supporting strips will always be forwardly of the user's body and that tensile force in the buttocks-support supporting strips will have an upward component directed forwardly of the user's body, thus better assuring that even if the person is in a forward-falling body posture the increased tensile force in the supporting strips forwardly located with respect to the user's body will be operative to help pull the user's legs upwardly toward a seated position, and (d) prevents a direct lineal pull in a direction direct toward the uppermost support means in the situation of a falling-backward posture which would tend to act to pull the user's legs so high as to drop the user flat on the user's back.

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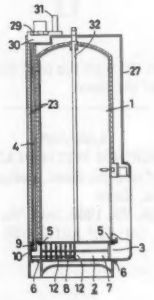
**4,303,042**

## WATER HEATER

**Tateo Sumiyoshi, Sakai, Japan, assignor to Kabushiki Kaisha Taada, Sakai, Japan**

**Filed Sep. 24, 1979, Ser. No. 78,285**
**Int. Cl.³ F22B *5/00***
**U.S. Cl. 122—17** **3 Claims**




1. A water heater comprising:

a vertically extending water tank;

a substantially cylindrical heat exchanger positioned horizontally in said water tank and extending diametrically across the lower part of said water tank and spaced above the bottom of said tank, said heat exchanger having an open end secured in water tight relation in the wall of said water tank on one side of said tank and having a closed end projecting out of the wall of said tank on the other side of said tank in water tight relation therewith, said heat exchanger having a combustion chamber adjacent the open end and an exhaust gas chamber cocupying the space between said combustion chamber and the closed end of said heat exchanger;

a burner directed into said combustion chamber from the open end thereof;

a baffle assembly removably fitted into said exhaust gas chamber and having a plurality of circular baffles extending transversely of said heat exchanger and spaced along the length of said exhaust gas chamber, each baffle having an aperture in the edge thereof positioned diametrically opposite the corresponding apertures in the edges of adjacent baffles, a plurality of cylindrical spacers extending between adjacent baffles, and a rod extending through said baffles and said spacers and secured to the end baffles at the opposite ends of said assembly; and

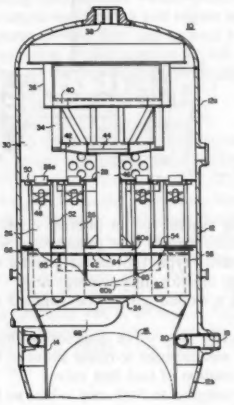
an exhaust pipe communicating with said heat exchanger at the closed end thereof and extending vertically therefrom outside said water tank, said exhaust pipe being covered with a heat insulating material.

4,303,043

## SLUDGE COLLECTION SYSTEM FOR A NUCLEAR STEAM GENERATOR

Arnold H. Redding, Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 25, 1979, Ser. No. 60,512
Int. Cl.[3] F22B *37/54*
U.S. Cl. 122—382 5 Claims



1. A sludge removal system for a vertically oriented nuclear steam generator wherein the vapors produced in the steam generator pass through means for separating entrained liquid from the vapor prior to the vapor being discharged from the generator, means including an upwardly open chamber for collecting the separated liquid prior to the liquid being returned to be mixed with the feedwater entering the generator, said chamber further including a generally horizontal baffle member separating the chamber into an upper and lower portion and having apertures therein for fluid flow therebetween for maintaining at least the liquid in the lower portion in a generally quiescent state to permit the solids within the liquid to settle therefrom, said liquid being discharged from said chamber by overflowing said upper portion and flowing therefrom into said feedwater and means for discharging the sludge collected in the lower portion from said steam generator.

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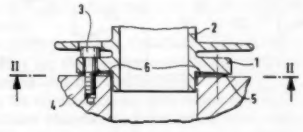
4,303,044

## ALUMINIUM 2-STROKE ENGINE CYLINDER AND CRANK CASE

Helmut Kottmann, Urbach, Fed. Rep. of Germany, assignor to Mahle GmbH, Stuttgart, Fed. Rep. of Germany

Filed Sep. 29, 1980, Ser. No. 191,756
Claims priority, application Fed. Rep. of Germany, Nov. 16, 1979, 2946317
Int. Cl.[3] F02B *75/02*
U.S. Cl. 123—65 R 2 Claims




1. An aluminium 2-stroke engine cylinder and the crank case assembly, said cylinder having a flange resting in sealing manner over its entire area upon a corresponding counter-surface of the crank case including a deformable packing lying between the sealing surfaces, and screw means for tightening the flange to the crank case, wherein the mutually opposite sealing surfaces of flange and crank case are slightly inclined in relation to one another in such a way that the distance between the sealing surfaces is greater radially inwards than radially outwards.

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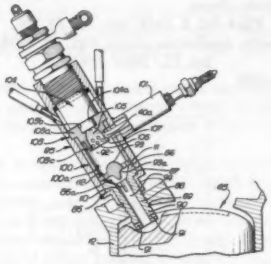
4,303,045

## APPARATUS TO CONVERT OTTO CYCLE ENGINE TO DIESEL ENGINE

George C. Austin, Jr., 1901 S. Fourth St., Alhambra, Calif. 91803

Continuation of Ser. No. 26,352, Apr. 2, 1979, abandoned, which is a continuation-in-part of Ser. No. 927,030, Jul. 24, 1978, abandoned. This application Dec. 12, 1980, Ser. No. 215,936
Int. Cl.[3] F02B *19/14*
U.S. Cl. 123—266 1 Claim



1. In a system for converting a spark ignition Otto cycle engine into a compression ignition or Diesel cycle engine, the engine including a combustion zone adjacent the end of the piston and wherein intake air is heated and compressed, the combination comprising

(a) pre-combustion chamber means independent of and attached to the engine head to communicate with said zone via the spark plug opening in the head, said chamber means having an inlet to pass pressurized fuel into the interior of said chamber means, for mixing with air from said combustion zone to pre-combust and flow to the combustion zone wherein combustion is completed, and

(b) said pre-combustion chamber means comprising a tubular barrel having a threaded portion with screw threaded telescopic attachment to the head, said barrel having a tip portion penetrating through said spark plug opening and provided with orifice means sized to control the flow of air to said chamber and to control the flow of pre-combusted products from said chamber, and

(c) means forming a thermal barrier between the barrel and the chamber interior,

(d) injection means fitting the barrel to provide a cover and a tubular projection aligned with the chamber interior to pass pressurized fuel into that interior, and

(e) flow diffusing surfaces in the chamber to diffuse air throughout the chamber and guide the flow of pre-combusted products from the chamber toward said tip portion,

(f) said tip portion being at one end of the barrel, and said inlet being at the opposite end of the barrel, there being a glow plug projecting sidewardly into the barrel between said tip portion and said inlet,

(g) compression means connected with the piston end portion closest to the combustion zone to effect an increase in heating and pressurization of intake air in that zone, said compression means comprising a cap extending over and connected to said piston end, the cap containing recesses to receive the engine valves and a gas flow guide recess in alignment with said spark plug opening to guide air flow from said zone to said chamber and to guide the pre-combusted products from said chamber to said zone, and

(h) cooling means including a coolant passage adjacent said

pre-combustion chamber to circulate fluid coolant in heat receiving relation with said injection means, said cooling means including a tubular jacket about the injection means in the form of a barrel, but everywhere spaced from that portion of the barrel attached to the engine head.

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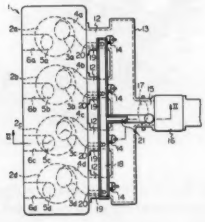
**4,303,046**

## INTAKE SYSTEM OF A MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

**Kiyoshi Nakanishi, Susono, and Katsuhiko Motosugi, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Jul. 3, 1979, Ser. No. 53,728**
**Claims priority, application Japan, Oct. 19, 1978, 53-127887**
**Int. Cl.³ F02F *1/42***
**U.S. Cl. 123—308** **34 Claims**



1. A multi-cylinder internal combustion engine, each cylinder having a helically-shaped intake port which comprises a helical portion having an outlet open end, an intake valve arranged in said outlet open end, and an inlet passage portion tangentially connected to said helical portion and having an inlet open end, said inlet passage portion being defined by an upper wall, a bottom wall, a first side wall arranged at a position near an axis of said intake valve, and a second side wall arranged at a position remote from the axis of said intake valve, said engine comprising:

at least one intake passage common to at least two cylinders and having at least two outlets, each being connected to the inlet open end of a respective one of said intake ports;

fuel supply means arranged in said intake passage;

valve means arranged in said intake passage and opened in accordance with an increase in the level of the load of said engine;

means for supplying an auxiliary flow of gas to each intake port when the respective intake valve is open during the intake stroke, said means including a common connecting passage and at least two branch connecting passages, each being connected to said common connecting passage and having an opening which opens into a respective one of said intake ports in the vicinity of the upper wall of said respective intake port at a position located downstream of said valve means, and further, wherein the first side wall of each of said inlet passage portions has an inclined wall portion which faces downwardly, and the opening of each respective branch connecting passage is directed towards said inclined wall portion, such that when each intake valve is opened, a flow of gas from the opening of the respective branch connecting passage is directed by said inclined wall portion and said upper wall towards the second side wall and thence along the circumference of said helical portion to develop a strong swirl motion prior to passing through said outlet open end into the cylinder.

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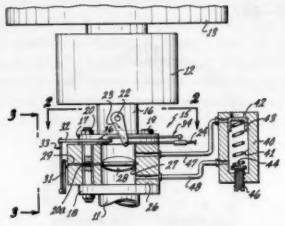
**4,303,047**

## DOUBLE THROTTLE VALVE CARBURATOR

**Josef Dorsic, 13603 Allerton St., Whittier, Calif. 90605**

**Filed Mar. 10, 1980, Ser. No. 128,594**
**Int. Cl.³ F02M *23/04***
**U.S. Cl. 123—327** **3 Claims**



1. In an intake system for an internal combustion engine having a carburator with a first passageway wherein is disposed a first butterfly type throttle valve and a venturi with a fuel nozzle, an air injector means comprising:

a body having a second passageway aligned with said first passageway;

a second butterfly type valve disposed within said second passageway and disposed to rotate about an axis normal to the axis of rotation of said first valve;

linkage means coupled to both said valves so that both said valves open and close together;

a cylinder having a well with one closed end and the other end opened to the atmosphere and having an internal flange at the open end;

a piston disposed within said cylinder;

a compression spring disposed within said cylinder to urge said piston against said internal flange;

a first duct communicating with the region of said cylinder adjacent said shoulder and with said first and second passageways in the region between said first and second valves;

a second duct communication with said cylinder and said second passageway in the region downstream and on the other side of said second valve, than the side which said first valve is disposed.

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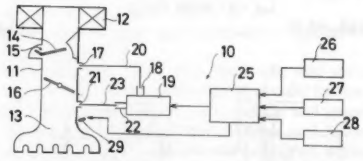
**4,303,048**

## ENGINE ROTATION SPEED CONTROL SYSTEM

**Shigeru Nishio, Kariya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Feb. 4, 1980, Ser. No. 117,922**
**Claims priority, application Japan, Feb. 9, 1979, 54-14695**
**Int. Cl.³ F02M *3/00, 23/00***
**U.S. Cl. 123—339** **4 Claims**



1. An engine rotation speed control system for automotive vehicles having an internal combustion engine comprising a carburetor having an air intake passage, an intake manifold and a throttle valve disposed intermediate said air intake passage and said intake manifold, air passage means by-passing said throttle valve disposed in communication with said air intake passage and said intake manifold, a solenoid actuated valve

provided with a solenoid coil disposed in said air passage means for controlling the amount of air by-passing said throttle valve when said throttle valve is closed during idling, a battery for supplying electric current to said solenoid coil, a resistor connecting said battery and one end of said solenoid coil, first and second switch means connected in series with each other and connected in parallel with said resistor, ignition switch means controlling said first switch and temperature sensitive means controlling said second switch whereby when said ambient temperature surrounding said engine is below a predetermined temperature said first and second switches will be closed upon operation of said ignition switch to by-pass said resistor and increase the current supplied to said solenoid coil.

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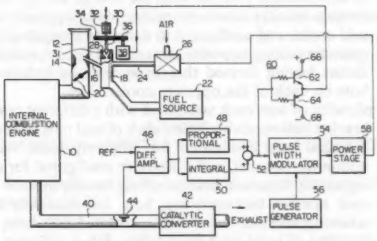
**4,303,049**

## COARSE AND FINE AIR SUPPLY CONTROL FOR CLOSED-LOOP CONTROLLED CARBURETED INTERNAL COMBUSTION ENGINES

**Kenji Ikeura, No. 2-1-19, Kubiri, Yokosuka; Masaaki Saito, No. 5-25-11, Iwato, Yokosuka; Michiyoshi Yamane, No. 4-16-4, Hamadayama, Suginami-ku, Tokyo; Hiroshi Sanbuichi, No. 3-5-20, Nakahara, Isogo-ku, Yokohama, and Akio Isobe, No. 1-49, Urago-cho, Yokosuka, all of Japan**

**Continuation of Ser. No. 854,218, Nov. 23, 1977, abandoned.**
**This application Jul. 6, 1979, Ser. No. 55,396**
**Claims priority, application Japan, Nov. 30, 1976, 51/144492**
**Int. Cl.³ F02B** *33/00;* **F02M** *7/00;* **F02B** *75/10;* **F02G** *3/00*
**U.S. Cl. 123—440** **1 Claim**




1. A closed loop mixture control system for an internal combustion engine, comprising:

a fuel source;

means defining an intake passage provided with a venturi and a throttle valve disposed downstream of said venturi, said intake passage communicable with the internal combustion engine to supply a combustible mixture;

an emulsion chamber communicating with said fuel source to receive fuel therefrom and with the atmosphere to receive air whereby fuel and air in said emulsion chamber are mixed to provide an air-fuel mixture;

a fuel nozzle extending from said emulsion chamber to open into said intake passage to supply said air-fuel mixture in said emulsion chamber into said intake passage;

means defining an exhaust passage communicable with the internal combustion engine to receive exhaust gases therefrom;

a first electromagnetic ON-OFF control valve arranged to control air flow communication between said emulsion chamber and the atmosphere;

means for controlling air flow communication between said emulsion chamber and the atmosphere, said air flow controlling means includes a metering needle arranged to cooperate with an orifice opening into said emulsion chamber, and an electric motor for actuating said metering needle in one direction when it is biased in one direction and for actuating said metering needle in the opposite direction when it is biased in the opposite direction;

an exhaust gas sensor provided to detect concentration of a component of the exhaust gas to generate a sensor signal representative of said concentration of said component of the exhaust gas;

a differential amplifier having an input connected to said exhaust gas sensor to receive said sensor signal to generate at its output a deviation signal representative of a difference between said sensor signal and a reference signal;

a proportional controller having an input connected to said output of said differential amplifier to receive said deviation signal to modify the amplitude of said deviation signal with a proportionality factor to provide at its output a proportional signal;

an integral controller having an input connected to said output of said differential amplifier to receive said deviation signal to provide time integration of said deviation signal with a predetermined integration rate to provide at its output an integration signal;

a summation junction connected to said outputs of said integral controller and said proportional controller and which provides a summation signal representative of summation of said proportional signal and said integral signal;

a pulse width modulator connected to said summation junction to generate at its output a train of pulses, each of which has a width representative of said summation signal;

means for actuating said electromagnetic ON-OFF control valve in response to said train of pulses; and

control means connected to said summation junction to receive said summation signal for actuating said air flow controlling means in response to said summation signal, said control means includes two power stages with their control inputs connected to said summation junction to receive said summation signal and arranged with respect to said electric motor to bias said motor in one direction when said summation signal is positive and to bias said electric motor in said opposite direction when said summation signal is negative.

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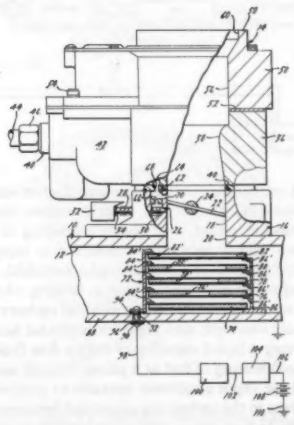
**4,303,050**

## HEATED FLOW DIRECTOR

**George E. Platzer, Jr., Troy, Mich., assignor to Chrysler Corporation, Highland Park, Mich.**

**Filed Nov. 13, 1979, Ser. No. 93,364**
**Int. Cl.³ F02M** *31/00*
**U.S. Cl. 123—549** **1 Claim**



1. In association with a vehicle intake manifold having an inlet permitting the entry of fluid flowing in one direction and outlet means permitting discharge of fluid flowing in a direction lateral to the entry direction so that the direction of fluid

flow abruptly changes, a fluid flow director assembly, comprising:

a series of thin plate members extending in substantial parallelism normal to the one fluid flow direction, the plates being spaced one from another to form flow passages along the plate surfaces and in the lateral flow direction;

the plate member being of a positive temperature coefficient material characterized by rapid changes in electrical resistivity corresponding to temperature changes over a small range;

means permitting the fluid flow to be apportioned over the various plate members as the flow changes from the one direction to the lateral direction, the means including formation of some of the plate members in a washer-like configuration with a peripheral annularity formed about a central open region whereby portions of fluid flow pass through the central regions and other portions pass laterally between and over the surfaces of the annularities;

the plates having peripheral annularities of varying widths, the plate most proximate to the inlet being the narrowest and the plate most remote from the inlet being the widest so as to more evenly apportion flow over the heated surfaces of the several plates;

plate heating means for energizing the positive temperature coefficient ceramic material of the plates to impart heat to liquid fuel which contacts the plate and to thereby vaporize the liquid;

circuit means including an electrical potential connected to the plate heating means.

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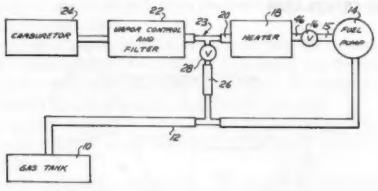
**4,303,051**

## FUEL ECONOMIZER

**Rainer E. Weishaar, Mt. Clemens, Mich., assignor to Michigan Motor Corporation, Mt. Clemens, Mich.**

**Filed May 9, 1977, Ser. No. 794,815**
**Int. Cl.[3] F02M *31/00***
**U.S. Cl. 123—557** **19 Claims**



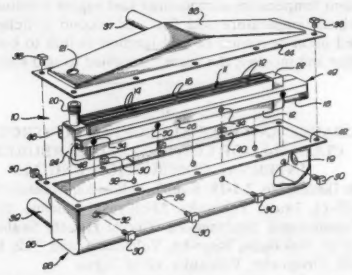

1. A fuel economizer for insertion into the fuel supply system of a conventional automotive vehicle engine having a fuel mixture intake manifold, such system consisting of a fuel tank, a fuel pump, and a carburetor connected to supply the fuel mixture directly into the engine intake manifold, the economizer comprising a heater having a heating chamber connected between the vehicle fuel pump and carburetor, heating means in said chamber, said chamber with said heating means therein having a liquid capacity of only a few fluid ounces to provide rapid heating of fuel as it passes through said chamber, and a catalytic vapor condenser operable to pass only gasoline in liquid phase to the carburetor connected between said heater and the vehicle carburetor, said vapor condenser comprising a second chamber filled with substantially uncompressed metal coils of thin, narrow, ribbon-like metal filaments, said second chamber with said coils therein having a liquid capacity of only a few fluid ounces.

**4,303,052**

## CHARGE AIR COOLER MOUNTING ARRANGEMENT

**Joseph N. Manfredo, Palos Verdes, and Selwyn R. Hirsch, Cypress, both of Calif., assignors to The Garrett Corporation, Los Angeles, Calif.**

**Filed Mar. 24, 1980, Ser. No. 133,538**
**Int. Cl.[3] F28F *1/32***
**U.S. Cl. 123—563** **20 Claims**



1. A charge air cooler mounting arrangement for mounting a charge air cooler into an engine intake manifold, comprising:

a charge air cooler for reception into the engine intake manifold, and having a first flow path for passage of charge air, and a second flow path for passage of a coolant in heat transfer relation with the charge air;

mounting bracket means extending along opposite sides of said cooler and configured to define an elongated channel extending along opposite sides of said cooler, said bracket means having formed therein at least on bolt-receiving hole on each of the opposite cooler sides;

a plurality of nuts each associated with a different one of the bracket bolt-receiving holes, each of said nuts including an enlarged base configured for relatively loose reception within the channel, and a shoulder configured for extending axially from said base relatively loosely into the associated bracket bolt-receiving hole for relatively loosely retaining said nut within said associated bolt hole;

a plurality of bolts each associated with a different one of said nuts, and receivable through the manifold and the associated bracket bolt-receiving hole and threadably into said associated nut for securing said cooler with respect to the manifold.

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**4,303,053**

## SPLIT MODE INTERNAL COMBUSTION ENGINE WITH IMPROVED $NO_x$ REDUCTION MEANS

**Yukihiro Etoh, Yokohama; Toshiaki Tanaka, Fujisawa; Haruo Yonezawa, Yokohama, and Yoshikatsu Sakamoto, Yokosuka, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed May 2, 1980, Ser. No. 146,019**
**Claims priority, application Japan, May 7, 1979, 54-55395**
**Int. Cl.[3] F02M *25/06;* F02D *17/00;* F01N *3/15***
**U.S. Cl. 123—568** **4 Claims**

1. A split mode internal combustion engine comprising:

a first group of cylinders;

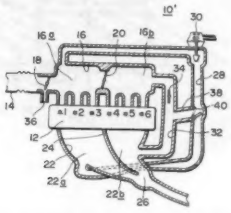
a second group of cylinders;

an intake system including first and second intake chambers which are respectively connected to said first and second groups cylinders for providing said cylinders with air-fuel mixture, and a valve means for providing a communication between said first and second intake chambers when said engine is in high load condition, and breaking said communication when said engine is in light load condition;

an exhaust system having first and second exhaust chambers which are respectively connected to said first and second groups of cylinders for separately receiving therein the

exhaust gas emitted from said cylinders, said first and second exhaust chambers being united at their downstream portions;

means for controlling said first and second groups of cylinders in such a manner that when said engine is in the high load condition, all of said first and second groups of cylinders operate to produce power, but when said engine is in the light load condition, only said first group of cylinders operate to produce power;



first exhaust gas recirculation means for feeding the exhaust gas contained in either one of said first and second exhaust chambers into said first intake chamber when said engine is in the high load condition, and feeding the exhaust gas gathering in said second exhaust chamber into said first intake chamber when said engine is in the light load condition; and

second exhaust gas recirculation means for feeding the exhaust gas gathering in the said second exhaust chamber into said second intake chamber only when said engine is in the light load condition.

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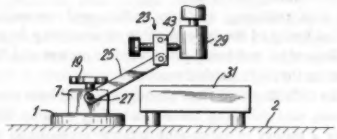
**4,303,054**

## DETACHABLE MAGNETIC BASE FOR MACHINE TOOL TABLE

**Nicola Lore, Bethpage, N.Y., assignor to Lopre Products, Inc., Farmingdale, N.Y.**

**Filed May 1, 1980, Ser. No. 145,726**
**Int. Cl.³ B24B *53/12***
**U.S. Cl. 125—11 R** **6 Claims**



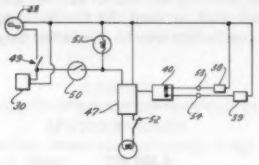
**1.** A magnetic base for detachably securing auxililary devices to a ferrous metal table of a machine tool comprising a substantially flat base member containing a permanently magnetized material adapted to adhere securely to said table and provided with a central hole therein, a body member securely affixed thereabove to said magnetic base member for supporting said devices, means for affixing said body member to said base member comprising a first threaded bolt provided with a central hole therein passing therethrough from one end to the other, said body member being provided with an upper threaded hole aligned with the hole in said bolt and adapted to receive a second threaded bolt for disengaging said magnetic base from said table, and a second threaded bolt in said upper threaded hole provided at the top thereof with a manually operable means for turning the same, and at the bottom thereof with a material softer than that of said table for engagement therewith, whereby upon advancing or retracting said second threaded bolt with respect to said table, said base may be either disengaged from said table or placed in magnetic engagement therewith.

**4,303,055**

## WASTE OIL HEATER HAVING FUEL CONTROL SYSTEM

**Stanley Fixler, P.O. Box 182, Rockaway, N.Y. 14602**

**Filed Jan. 7, 1980, Ser. No. 110,265**
**Int. Cl.³ F24C *5/00*; F23N *5/00***
**U.S. Cl. 126—93** **2 Claims**



**1.** In a pot type heat vaporizing oil heater including an oil burning section and an oil feeding system for feeding oil from a tank to the burning section, said oil feeding system having pump means for pumping oil to the burning section, motor means for operating the pump means, and terminals adapted to be connected to an electric source; the improvement comprising a control system for the oil feeding system, said control system comprising relay means and thermo-responsive switch means connected between said motor means and said terminals, combustion detecting means mounted in the burning section to detect combustion of oil, said detecting means being connected to said relay means to allow electric current to pass through the relay means from the terminals to the motor means when said detecting means detects combustion of oil, said thermo-responsive switch means being connected to enable operation of said relay means and said detecting means only when the combustion of oil in the burning section is stably established, and further including indicator means connected to indicate the on-off condition of said thermo-responsive switch means, and an operating switch for connecting said combustion detecting means to said relay means.

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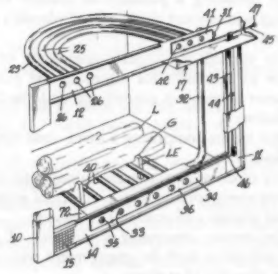
**4,303,056**

## FIREPLACE CLOSURES

**John W. Slavik, 5275 Mahoning NW., Warren, Ohio 44485, and Nancy L. Shafer, 5865 Oakhill Dr., West Farmington, Ohio 44491**

**Filed Aug. 20, 1979, Ser. No. 67,757**
**Int. Cl.³ F24B *7/00***
**U.S. Cl. 126—121** **14 Claims**



**1.** A fireplace front for spanning the opening into a fireplace, said front comprising a metal frame having connected top, bottom and side strips defining a frame opening, and glass doors within said frame opening to provide access to the fire in said fireplace,

a motor-driven blower,

said bottom strip having a plurality of openings therein to permit passage of room air by convection,

a conduit extending from the outlet of said blower, and

tube means, having one end adapted to receive air selectively by either convection through said bottom strip openings or by blower-forced air through said conduit, said tube means having another end open and extending into said fireplace with said open end directed toward the fire therein, whereby the start of said fire may be assisted by blower-forced air until the fire has caught on, and thereafter combustion may be maintained only by convection air.

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**4,303,057**

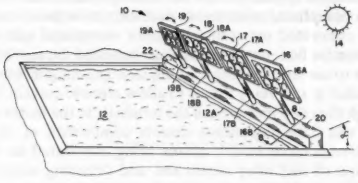
## SWIMMING POOL SOLAR HEATER

**Reba L. Crandon, 10406 N. 21st St., and Elwood Marple, 1330 137 Ave., E., both of Tampa, Fla. 33612**

**Filed Aug. 16, 1979, Ser. No. 66,931**

**Int. Cl.³ F24J *3/02*; G02B *7/02***

**U.S. Cl. 126—415** **3 Claims**



**1.** A swimming pool solar heater, comprising in combination:

a plurality of sunlight condenser elements each having a plurality of condensing lenses secured in a frame;

mounting means for rotatably mounting each of said sunlight condenser elements for projecting a portion of the condensed sunlight onto the water within the swimming pool;

motor means for rotating said plurality of condenser elements to compensate for the relative movement between the sun and the earth thereby maintaining the projection of the condensed sunlight onto the water within the swimming pool;

each of said condenser elements being supported by a support shaft;

a base disposed along the edge of the swimming pool;

said base including a plurality of sockets for removably securing said support shafts of said plurality of condenser elements;

means for varying the angular orientation of said sockets relative to the earth for adjusting the position of said condenser elements in accordance with the latitude of the installation;

said motor means comprising a drive shaft extending along said base;

a plurality of drive means spaced along said drive shaft for simultaneously rotating said plurality of sockets for rotating said plurality of condenser elements;

said drive means comprising a plurality of gears spaced along said drive shaft for engagement with gears secured to said plurality of sockets;

said sockets being keyed for removably receiving said support shafts enabling said sunlight condenser elements to be installed within said base in the identical orientation with respect to the swimming pool from which said sunlight condenser elements were oriented prior to being removed from said base.

**4,303,058**

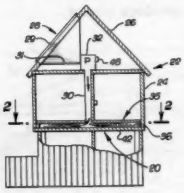
## PASSIVE SOLAR HEATING SYSTEM

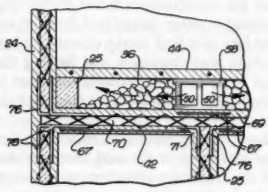
**Joo H. Chun, 845 S. Grand View St., Los Angeles, Calif. 90057**

**Filed Dec. 18, 1979, Ser. No. 104,967**

**Int. Cl.³ F24J *3/02***

**U.S. Cl. 126—430** **6 Claims**





**1.** In a building, a heating apparatus that heats said building, at least partially by a passive heater contained in a floor of the building that is located at a location above the ground, said heating apparatus comprising:

a floor structure having a vacancy within its interior;

a solar powered heat source for heating a flow of air to a temperature that exceeds the ambient temperature of the air surrounding said floor;

a solid heat retaining medium within said vacancy, said medium being of the type capable of accepting heat from said flow of air and being positioned to permit said flow to permeate throughout said medium;

means for diffusing said flow throughout said heat retaining medium, said diffusing means including a pump for producing a supply of super-atmospheric pressurized heated air, and a conduit for carrying said flow of heated air throughout said heat retaining medium;

a plurality of panels of the type having at least one mesh forming a major lateral surface and having truss members connected to said mesh and joining said major lateral surfaces, said panels being disposed vertically and interconnected to one another to form wall;

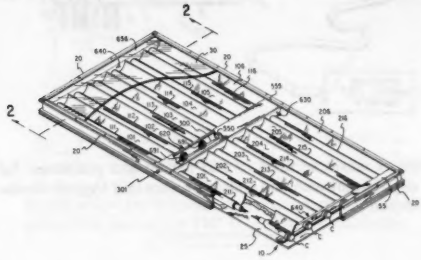
at least one panel of the type having at least one mesh forming a major lateral surface and having truss members connected to said mesh and joining said major lateral surfaces said panel being disposed horizontally to and connected to said vertical walls to form a floor member therebetween, said horizontal panel having portions outward of said mesh, adapted to secure reinforcing bars which resist force moments induced in said panel, said connection between said wall and floor panels including a plurality of bent dowels whose ends are attached to said meshes of said vertical and horizontal panels, all of said panels being covered with a cementitious mixture of portland cement and sand.

4,303,059

## APPARATUS FOR SOLAR ENERGY COLLECTION

R. Gary Ford, Memphis, Tenn., assignor to Energy Design Corporation, Memphis, Tenn.

Filed Sep. 6, 1979, Ser. No. 72,823
Int. Cl.[3] F24J 3/02
U.S. Cl. 126—438 18 Claims



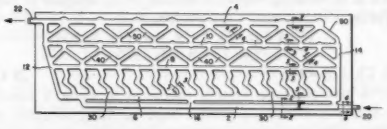
1. Apparatus for collecting solar energy, comprising:
a housing having an open top;
a solar radiation-transmissive cover removably mounted on the top of said housing;
a plurality of elongated open-ended troughs mounted side-by-side in said housing, said troughs having solar radiation-reflective inner surfaces;
a fluid-carrying tube system having a plurality of branches which respectively extend along each trough near the bottom thereof;
a pair of end panel assemblies mounted in said housing at opposing ends of said row of troughs and forming the ends of said troughs, each of said end panel assemblies including adjacent elongated upper and lower end panels which are removably coupled to each other and have a common elongated edge, the surface of each of said upper and lower end panels which faces said troughs being reflective of solar radiation, each of said upper and lower end panels having a semicircular aperture at the common edge so as to form a circular aperture at about the lateral center of each trough, said fluid tube branches extending through the apertures of one of said end panel assemblies, said lower end panels including a flange which serves as a shelf to support the ends of said troughs; and
a plurality of elongated cylindrical evacuated tubes, each having a hollow core proportioned to removably fit over a respective branch of the fluid-carrying tube system, the opposing ends of each evacuated tube being supported in the apertures of the end panel assemblies of the respective trough.

4,303,060

## COLLECTOR PANEL FOR SOLAR HEATING SYSTEM

Kenneth D. Mart, Naples, Fla., assignor to Walker & Mart Solar Laboratories, Inc., Naples, Fla.

Filed Dec. 20, 1979, Ser. No. 105,647
Int. Cl.[3] F24J 3/02; F28F 3/14
U.S. Cl. 126—445 4 Claims



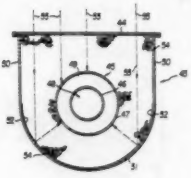
1. A collector panel for a solar heating system, comprising two elongated rectangular metal sheets bonded together in face-to-face relation except along elongated narrow areas defining between the sheets a network of conduits for a moving heat absorbing liquid, the network comprising two parallel conduits extending along the opposite longitudinal edges of the panel and providing inlet and outlet headers for the liquid, a plurality of parallel conduits extending longitudinally of the panel intermediate and parallel to the header conduits, and a plurality of conduits extending transversely of the panel and interconnecting the headers and the intermediate longitudinal conduits, the transverse conduits being arranged in tiers extending longitudinally of the panel between the headers and the intermediate conduits, each of the transverse conduits being disposed angularly to the headers and intermediate conduits throughout at least part of its length.

4,303,061

## SOLAR ENERGY COLLECTOR HAVING HOLLOW MICROSPHERES

Leonard B. Torobin, Materials Technology Corp., Box 6844, Bellevue, Wash. 98007

Division of Ser. No. 59,297, Jul. 20, 1979, abandoned, which is a continuation-in-part of Ser. No. 937,123, Aug. 28, 1978, abandoned, which is a continuation-in-part of Ser. No. 944,643, Sep. 21, 1978, abandoned. This application Dec. 13, 1979, Ser. No. 103,344
Int. Cl.[3] F24J 3/02
U.S. Cl. 126—450 32 Claims



1. A solar energy collector comprising an outer transparent cover and an inner cover, and having disposed therebetween a black coated heat absorber and at least one heat exchange medium tube, wherein said outer cover consists of a transparent sheet or panel comprising a mass of hollow glass microspheres cemented together by fusion or sintering or bonded together with an organic or inorganic bonding agent or adhesive, said microspheres being of substantially uniform diameter of 500 to 6,000 microns and of substantially uniform wall thickness of 0.5 to 400 microns, wherein said microspheres are free of latent solid or liquid blowing gas materials or gases and the walls of said microspheres are substantially free of holes, relatively thinned wall portions or sections, sealing tips and bubbles.

4,303,062

## THERAPEUTIC MAGNET

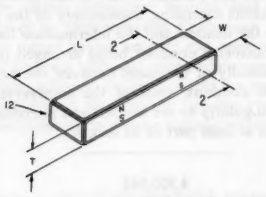
Charles A. Vars, Amherst, N.H., assignor to InterVet, Inc., Milford, N.H.

Filed Jul. 9, 1980, Ser. No. 167,116
Int. Cl.[3] A61B 19/00; A61N 1/42
U.S. Cl. 128—1.3 3 Claims

1. A therapeutic magnetic bar for retention in the second stomach or reticulum of cattle, comprising
an elongate magnet formed of a sintered material having the general formula $MoO.6(Fe_2O_3)$, in which MO represents an oxide or oxides of one or more of the metals chosen from the group comprising barium, strontium and lead, said magnet being large enough for permanent retention in said second stomach, having a rectangular cross section in planes transverse to its principal dimension and being magnetized transversely to said dimension with its pole faces comprising the surfaces of greatest area, the length in said principal dimension being at least twice any one of the dimensions in said cross section,

and

a continuous polymeric coating enveloping said magnet and




having a substantially uniform thickness and a tear strength sufficient to resist rupture in the event that said magnet is fractured.

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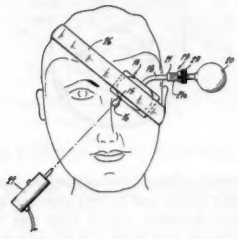
**4,303,063**
**OCULAR MASSAGE DEVICE**
**Norman O. Stahl, 3199 Monterey Dr., Merrick, N.Y. 11566**
**Filed Mar. 6, 1980, Ser. No. 127,596**
**Int. Cl.³ A61H *1/02*; A61F *13/12***
**U.S. Cl. 128—25 A** **6 Claims**



**1.** An ocular massage device for attachment to the head of a patient comprising a rigid plate, a curved portion on said plate, a first inflatable member carried by the plate to overlie the eye of the patient, an entrance port for the first inflatable member to direct fluid under pressure into the said inflatable member, an exit port on the first inflatable member to direct fluid out of the inflatable member, a first and a second valve means connected to the entrance and exit ports to control the fluid pressure in the first inflatable member, a second inflatable member coupled to the exit port of the second value means to receive fluid from the said valve means and means to secure the plate to the head of the patient over the eye to be treated.

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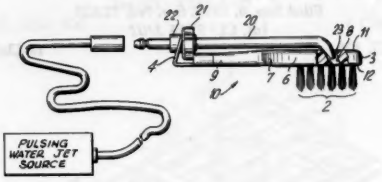
**4,303,064**
**ORAL HYGIENE DEVICE**
**Michael J. Buffa, 277 Lindenmere Dr., Merrick, N.Y. 11566**
**Continuation of Ser. No. 27,867, Apr. 6, 1979, abandoned. This application Sep. 30, 1980, Ser. No. 192,213**
**Int. Cl.³ A61H *7/00***
**U.S. Cl. 128—62 A** **3 Claims**

**1.** An oral hygiene device adapted to be removably attached to a fluid jet having an elongated nozzle with an orifice inclined relative to a shank of said nozzle, and having a collar at the distal end of said nozzle, said brush comprising:

a head having bristles extending laterally thereof;

a handle extending from said head along a central axis thereof;

a fluid conduit extending through said head and terminating among said bristles, said conduit being angled relative to said head with an inclination corresponding to the inclination of said orifice relative to said shank for receiving said orifice; and




resilient means secured to said handle and positioned for engagement with said collar to secure said hygiene device to said jet.

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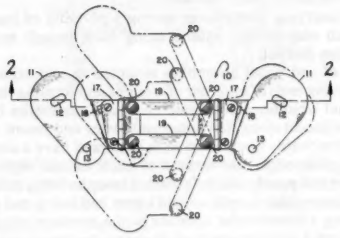
**4,303,065**
**ORTHOPEDIC APPLIANCE**
**Albert L. Ericson, 2309 E. Hawthorne St., Tucson, Ariz. 85719**
**Filed Jan. 23, 1980, Ser. No. 114,578**
**Int. Cl.³ A61F *3/00***
**U.S. Cl. 128—80 A** **5 Claims**




**1.** An orthopedic appliance adapted for attachment to the shoes of a child comprising a pair of sole plate members, openings formed in the ball and heel portions of the sole plate member, hinge members mounted directly on the undersurface of said sole plate members, elongated openings formed along one side of said sole plate members, a fastener extending through said elongated elongated openings and said hinge members, a parallel linkage pivotally secured to said hinge members, the openings formed in the ball portion of the plate members providing a means for adjustably securing the shoes to the sole plate members and the elongated openings formed in said sole plate members providing a means for adjustably securing said sole plates to said hinge plates.

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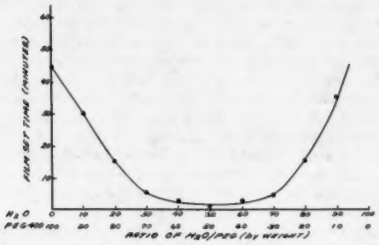
**4,303,066**
**BURN DRESSING**
**Mark J. D'Andrea, Neshanic Station, N.J., assignor to National Patent Development Corporation, New York, N.Y.**
**Filed Jun. 28, 1979, Ser. No. 52,924**
**Int. Cl.³ A61L *15/00***
**U.S. Cl. 128—156** **29 Claims**

**1.** A two-package system useful in forming a non-tacky, non-toxic, non-stinging plastic burn dressing directly on the wound of the skin which consists essentially of:

(a) a first package containing particulate hydrophilic polymer having the following characteristics: lower-alkanol insolubility, water-swellability, water-insolubility, and a molecular weight above about 50,000; and

(b) a second package used with said first package and con-

taining liquid comprised of from 20 to 80 weight percent water and from 80 to 20 weight percent of an inert organic



liquid, said organic liquid being characterized by a boiling point of at least about 120° C. and water-miscibility.

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**4,303,067**

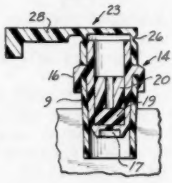
## MEDICAL LIQUID BAG HAVING AN IMPROVED ADDITIVE PORT

**Terry Connolly, Aukland, New Zealand; Milton L. Patrick, Lake Forest, Ill.; Thomas E. Rudolph, Mission Viejo, Calif., and Alan Stanley, Aukland, New Zealand, assignors to American Hospital Supply Corporation, Evanston, Ill.**

**Filed Jan. 21, 1980, Ser. No. 113,930**

**Int. Cl.³ A61J *1/00***

**U.S. Cl. 128—272** **15 Claims**



**1.** A medical liquid bag with a pair of opposed walls, wherein the improvement comprises: a support tube sealed between the opposed walls and extending outwardly beyond the walls; a puncture tube with an inner portion fitting within the support tube and an outer portion extending outwardly beyond the support tube; a diaphragm integral with the puncture tube closing off a passage to the puncture tube; a puncturable resealable plug in the passage of the puncture tube; a retainer tube means sealed to the puncture tube to urge the plug toward the diaphragm; and a tear-off closure sealed to the outer portion of the puncture tube.

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**4,303,068**

## METHOD AND APPARATUS FOR SINGLE PASS HEMODIALYSIS WITH HIGH FLUX MEMBRANES AND CONTROLLED ULTRAFILTRATION

**D. Allen Zelman, Troy, N.Y., assignor to Rensselaer Polytechnic Institute, Troy, N.Y.**

**Filed Feb. 28, 1978, Ser. No. 882,111**

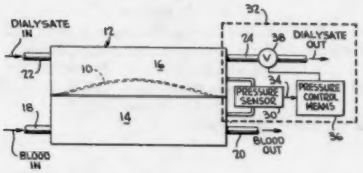
**Int. Cl.³ B01D *13/00, 31/00***

**U.S. Cl. 128—214 B** **5 Claims**

**1.** A method of single pass hemodialysis for removal of metabolites from the blood of a patient including middle molecules of a size on the order of 300 to 2000 daltons, comprising the steps of:

providing a single pass hemodialyzer with a freelymounted membrane having an ultrafiltration coefficient of at least 20 ml $m^{-2}$ $hr^{-1}$ $mmHg^{-1}$;

connecting said patient to said single-pass hemodialyzer in a conventional manner; and




operating said hemodialyzer with a transmembrane pressure of between 0 and 30 mmHg to reduce ultrafiltration of the patient.

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**4,303,069**

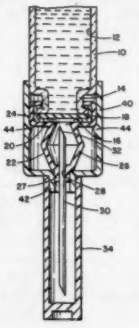
## HYPODERMIC SYRINGE WITH NEEDLE GUIDE

**Milton J. Cohen, 10823 Burbank Dr., Potomac, Md. 20854**

**Continuation-in-part of Ser. No. 956,102, Oct. 30, 1978, abandoned. This application Mar. 24, 1980, Ser. No. 133,569**

**Int. Cl.³ A61M *5/00***

**U.S. Cl. 128—218 N** **5 Claims**



**1.** A syringe assembly comprising a tubular member, a rupturable closure sealing the forward end of the tubular member an elongate hollow hypodermic needle, and collapsible hub member formed of flexible material connected at one end to the forward end of the tubular member, the other end being of reduced cross section with a passage therethrough through which an intermediate portion of the needle extends for conjoint movement therewith, with the rearward end of the needle terminating a short distance in advance of the rupturable closure when the hub member is in uncollapsed position and penetrating through the rupturable closure when in collapsed position, the improvement which comprises a tubular guide member having an open end in telescoping engagement with the forward end portion of the tubular member to enable relative sliding movement in the axial direction, the other end having an inwardly extending bottom wall portion terminating in a sleeve section into which the reduced cross section of the hub member extends for engagement therewith, an elongate cover dimensioned to have a length greater than the length of the needle extending outwardly of the hub, said cover being closed at one end and open at the other end with the opening being dimensioned slidably to be received on the sleeve section of the bottom wall of the tubular guide, and an operative engagement between the other end of said tubular guide member and the other end of the collapsible member for conjoint movement therewith for axial guidance of the hub and needle during displacement to collapsed position, means for latching the hub in collapsed position to retain the hub member in collapsed position with the needle extending through the rup-

turable closure while the needle cover is removed from the sleeve section to expose the needle.

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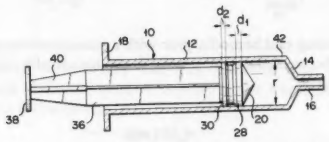
**4,303,070**

## SYRINGE

**Toshiji Ichikawa, and Teruko Watanabe, both of Tokyo, Japan, assignors to Terumo Corporation, Tokyo, Japan**

**Filed Sep. 22, 1980, Ser. No. 189,148**
**Claims priority, application Japan, Oct. 9, 1979, 54-130178**
**Int. Cl.³ A61M *5/00***
**U.S. Cl. 128—218 P** **21 Claims**




1. A syringe comprising an outer cylinder; a gasket having at least one part which slidably contacts the inner wall of said outer cylinder under the compressed condition forming a water-tight seal and being made of a colorable thermoplastic elastomer material including a block copolymer having a mean molecular weight between about 50,000 and about 200,000 and having the general formula

$$(St)_{\overline{m}}(A)_{\overline{n}}(St)_{m'}$$

(where St represents styrene units, A represents a unit derived from an unsaturated hydrocarbon having 2–5 carbon stoms or combinations thereof, and m, m' and n represent the mol % of each unit, the sum of m and m' being 2–20 mol %); and means for sliding said gasket inside said outer cylinder, said slidably contacting part being compressed inside said outer cylinder at a compressibility C (%) of a predetermined range selected according to a particular inner diameter of said outer cylinder, the product (S×C) of the total contact area S ($mm^2$) of said slidably contacting part with the inner wall of said outer cylinder with said compressibility C (%) being about 350 to about 900, the value of S ($mm^2$) being measured at said compressibility C (%).

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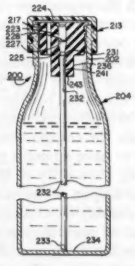
**4,303,071**

## SYRINGE-TYPE LIQUID CONTAINER DISPENSER ADAPTER

**Philip E. Smith, Chicago, Ill., assignor to Baxa Corporation, Northbrook, Ill.**

**Continuation-in-part of Ser. No. 931,712, Aug. 7, 1978, Pat. No. 4,230,112. This application Jun. 19, 1980, Ser. No. 161,174**
**Int. Cl.³ A61J *1/00***
**U.S. Cl. 128—272.3** **10 Claims**




1. An adapter for connecting in fluid communication a nozzle of a liquid medication dispensing syringe-type dispenser with the interior of a bottle having a bottom wall and containing liquid medication or the like comprising:

a tubular body member composed of resilient material and being generally cylindrical in shape to fit snugly within the mouth of the bottle;

means defining an opening extending axially through said body member for receiving the nozzle of the syringe-type dispenser, said opening including a forward nozzle receiving portion and a rear portion, the axial length of said forward portion being substantially the same as the axial length of the nozzle so that the exit end of the nozzle terminates near said rear portion when the nozzle is inserted fully within said opening;

means defining a fluid pathway disposed at said rear portion of said opening for guiding liquid to said forward nozzle-receiving portion and for preventing or minimizing the introduction of air into said opening;

means defining a re-entry vent opening extending axially through said body member terminating near the bottom thereof to vent to the atmosphere the space between the liquid level and said member; and

said means defining a fluid pathway including a tube depending from the adapter into the bottle terminating at its lower end near the bottom wall of the bottle for conveying liquid medication therefrom to the nozzle of the dispenser; valve means disposed in said fluid pathway for permitting liquid medication to flow from said tube to the nozzle when it is inserted in the nozzle-receiving opening and for trapping liquid medication in said tube near the first-mentioned opening when the dispenser is withdrawn from said opening, said valve means being a web extending across the first-mentioned opening and having a slit therein for receiving the nozzle of the dispense.

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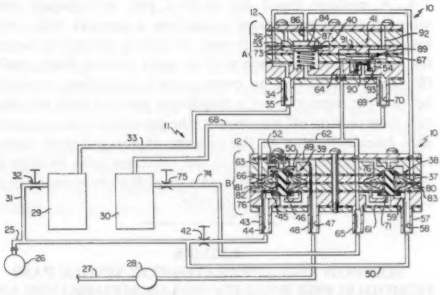
**4,303,072**

## INTERMITTENT PATIENT SUCTION SYSTEM AND CONTROL MEANS THEREFOR

**Jay L. Lewis, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.**

**Division of Ser. No. 860,995, Dec. 15, 1977, Pat. No. 4,213,457. This application Mar. 6, 1980, Ser. No. 127,866**
**The portion of the term of this patent subsequent to Jul. 22, 1999, has been disclaimed.**
**Int. Cl.³ A61M *1/00***
**U.S. Cl. 128—276** **10 Claims**




1. In an intermittent suction system having output means for alternately applying a vacuum and atmospheric pressure to a patient for removing fluids from said patient and wherein said system includes a vacuum source and first and second container means adapted to be interconnected to operating means of control means and to said source and said atmospheric pressure by said operating means of said control means that is adapted to apply said vacuum through said output means to said patient in response to a vacuum condition of said first container means and to apply said atmospheric pressure through said output means to said patient in response to a vacuum condition in said second container means, the improvement comprising means in said operating means of said

control means for always interconnecting said vacuum through said output means to said patient when said vacuum condition in said first container means is a certain percentage of the vacuum condition of said source regardless of the vacuum value of said source so as to prevent any adverse interruption in said system during the use thereof for said patient should the vacuum level of said source fall to an undesirable level.

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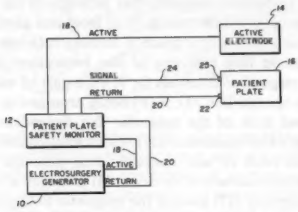
**4,303,073**

## ELECTROSURGERY SAFETY MONITOR

**G. Kent Archibald, White Bear Lake, Minn., assignor to Medical Plastics, Inc., Milford, Conn.**

**Filed Jan. 17, 1980, Ser. No. 113,106**
**Int. Cl.³ A61B *17/36***
**U.S. Cl. 128—303.13** **40 Claims**




1. In an electrosurgery system having an active electrode and having a return electrode for connection to the body of a patient, the improvement comprising:

the return electrode comprising:

a first surface for contact with the body;

ohmic contact means exposed at the first surface for providing ohmic contact to the body;

a first electrically conductive layer isolated electrically from the ohmic contact means;

a dielectric layer interposed between the conductive layer and the first surface;

a first electrical terminal connected to the ohmic contact means; and

a second electrical terminal connected to the first conductive layer;

means connected to the first and second electrical terminals for sensing a capacitance indicative of area of contact between the first surface of the return electrode and the body of the patient; and

means for providing an alarm signal if the area of contact is less than a predetermined amount.

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**4,303,074**

## METHOD FOR APPLYING THERAPEUTIC HEAT

**Joseph M. Bender, Winnipeg, Canada, assignor to Pascal & Associates, Ottawa, Canada**

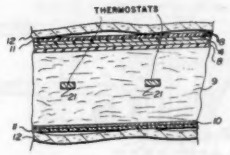
**Division of Ser. No. 893,764, Apr. 5, 1978, Pat. No. 4,186,294. This application Jun. 11, 1979, Ser. No. 47,581**
**Claims priority, application Canada, Feb. 3, 1978, 296254**
**Int. Cl.³ A61F *7/00***
**U.S. Cl. 128—399** **6 Claims**

1. A method for applying therapeutic heat comprising the steps of:

(a) generating radiant heat energy at a wavelength which penetrates into a human or animal body, said radiant heat being generated in at least one flexible electrically insulating and radiant energy permeable layer,

(b) disposing a thermal insulation layer against the human or animal body and covering it with the layer forming the source of said radiant energy,

(c) reflecting said radiant energy against the surface of and through the thermal insulation layer and into the human or animal body, and




(d) sealing a radiant energy permeable envelope around the entire heater used in steps (a)–(c).

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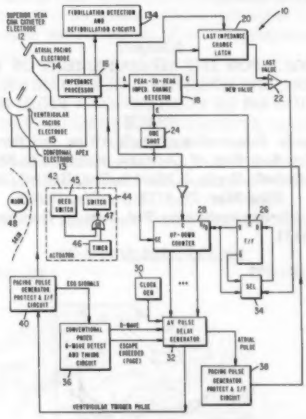
**4,303,075**

## METHOD AND APPARATUS FOR MAXIMIZING STROKE VOLUME THROUGH ATRIOVENTRICULAR PACING USING IMPLANTED CARDIOVERTER/PACER

**Marlin S. Heilman, Gibsonia, and Alois A. Langer, Pittsburgh, both of Pa., assignors to Mieczyslaw Mirowski, Owings Mills, Md.**

**Filed Feb. 11, 1980, Ser. No. 120,099**
**Int. Cl.³ A61N *1/36***
**U.S. Cl. 128—419 PG** **13 Claims**



1. A method of maximizing stroke volume of a heart through atrioventricular pacing using a pair of electrodes connected in proximity to the heart and an implanted cardioverter/pacer emitting pacing pulses, comprising the steps of:

measuring successive impedance changes across said electrodes from one heart cycle to the next;

processing said successive impedance changes to detect directions of variation thereof;

issuing atrial and ventricular pacing pulses, separated by a time interval therebetween, to the atria and to the ventricles, respectively, of the heart; and

selectively increasing or decreasing the time interval between said atrial and ventricular pacing pulses in depen-

dence on said directions of variation of said successive impedance changes.

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**4,303,076**

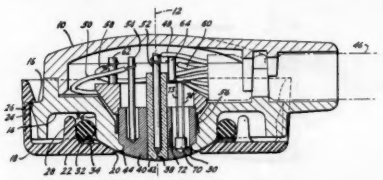
## PROBE FOR TRANSCUTANEOUS SAMPLING

**Josef Danek, Doylestown, Pa., assignor to Air Shields, Inc., Hatboro, Pa.**

**Filed Dec. 31, 1979, Ser. No. 108,800**

**Int. Cl.³ A61B 5/00**

**U.S. Cl. 128—635** **27 Claims**



**1.** A probe comprising:

a housing;

an electrode unit held within said housing and forming a domed surface which projects from said housing;

a cup-like cap having an opening in the base thereof through which said domed surface projects and a lip engaging said housing by a snap fit to secure said cap to said housing;

a membrane secured to said cap and spanning said opening in said base of said cap;

an electrolyte between said domed surface and said membrane;

sealing means positioned between said housing and said membrane for preventing said electrolyte from escaping; and means for electrically connecting said electrode unit to a remote location.

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**4,303,077**

## DEVICE FOR THE MEASUREMENT OF THE LOCATION, THE POSITION AND/OR THE CHANGE OF LOCATION OR OF POSITION OF A RIGID BODY IN SPACE

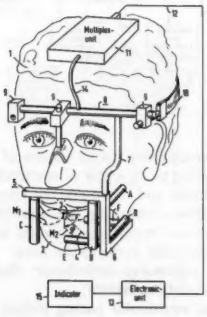
**Arthur Lewin, Johannesburg, South Africa, and Bernd Nickel, Bensheim, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Mar. 29, 1979, Ser. No. 25,263**

**Claims priority, application Fed. Rep. of Germany, Apr. 4, 1978, 2814551**

**Int. Cl.³ A61B 5/05, 5/10**

**U.S. Cl. 128—777** **15 Claims**




**1.** Device for the measurement and registration of the location, the position and/or the change of location or position of a rigid body in space, said device comprising a magnetic field generator for generating a field comprising magnetic field flux and for mounting in fixed relation to the body, sensing means for determining the magnetic field flux or the magnetic field flux change during a measurement operation, said sensing means being arranged at a distance from the magnetic field generator and being mounted independently of the magnetic field generator, and an electronic installation coupled with said sensing means for the production and evaluation of electric signals in accordance with magnetic field flux or a magnetic field flux change, said magnetic field generator (3) being designed in such manner that it generates a defined irregular field; said sensing means being operable for determining the magnetic field flux in at least two planes disposed mutually perpendicularly to one another and comprising a plurality of pairs of magnetic flux pick-ups (A/B; C/D; E/F) with magnetic flux-dependent sensor elements (17), and support means mounting the respective magnetic flux pick-ups of the respective pairs at respective intervals (a, b, c) from one another and in such a manner that a free space is formed between the respective magnetic flux pick-ups of the respective pairs by means of the respective intervals (a, b, c), a pair of said magnetic flux pick-ups (A/B; C/D; E/F) being arranged in each of said planes, and each of the magnetic flux-dependent sensor elements being a Hall generator (17) with a longitudinal axis of symmetry, and each of said magnetic flux pick-ups further comprising a field-interactive element (18) arranged at the side of the Hall generator (17) toward the magnetic field generator (3), and having a longitudinal axis parallel to the longitudinal axis of symmetry of the Hall generator (17) and spaced at an interval (d) from said longitudinal axis of symmetry of the Hall generator (17), so that the Hall generators of the respective magnetic flux pick-ups provide linearized signals independent of relative movement between the magnetic field generator and the sensing means parallel to the longitudinal axes of the respective field-interactive elements.

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**4,303,078**

## AGRICULTURAL MACHINE

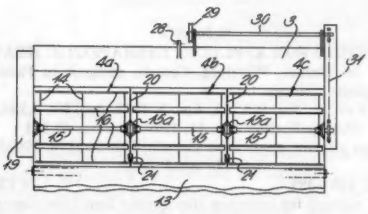
**Sigmund Stokland, Holmestrand, Norway, assignor to Retford Sheet Metal Limited, Nottinghamshire, England**

**Filed Feb. 5, 1980, Ser. No. 119,005**

**Claims priority, application United Kingdom, Feb. 6, 1979, 04048/79**

**Int. Cl.³ A01F 7/04**

**U.S. Cl. 130—27 J** **4 Claims**



**1.** A harvester-thresher comprising at least two coaxial, horizontal rotatably-mounted threshing cylinders mounted in the forward end of a housing and joined together through at least one bearing, a generally vertical plate supporting the bearing and provided with a cutting device positioned in the forward end of the housing so as to act upon harvested crop entering said forward end before the crop is acted on by the threshing cylinders.

4,303,079

## RADIAL BLOWING DEVICE FOR A CLEANING ARRANGEMENT OF A HARVESTER THRESHER

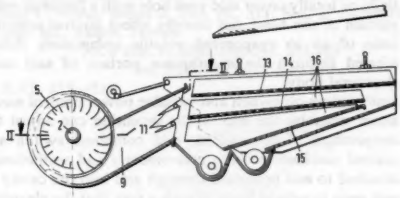
Helmut Claas, and Franz Tophinke, both of Harsewinkel, Fed. Rep. of Germany, assignors to Claas OHG, Harsewinkel, Fed. Rep. of Germany

Filed May 23, 1980, Ser. No. 152,580

Claims priority, application Fed. Rep. of Germany, Jun. 2, 1979, 2922607

Int. Cl.³ A24C 1/08

U.S. Cl. 130—272 14 Claims



1. A radial blowing device for a harvester thresher cleaning arrangement having an upper sieve, a lower sieve and a guiding bottom, the device comprising at least two blowers each including a double impeller with two sets of blades; at least two wind passage means each forming a wind passage which extends from each of said double impellers; and at least two subdividing means each subdividing a respective one of said wind passages into two half passages, so that each of the half passages of each of said wind passages communicates with a respective one of said sets of blades of a respective one of said double impellers, and each of said subdividing means extends up to the double impeller of a respective one of said blowers.

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4,303,080

## METHOD FOR PRODUCING FILTER CIGARETTES

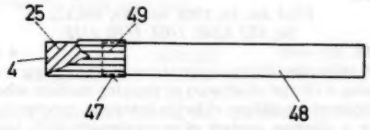
Serge Boegli, Zürich, and Jean-Pierre Lebet, Montreux, both of Switzerland, assignors to F. J. Burrus, Boncourt and Cie and Baumgartner Papier S. A., Crissier, both of, Switzerland

Filed Mar. 31, 1978, Ser. No. 892,095

Claims priority, application Switzerland, Apr. 4, 1977, 4179/77

Int. Cl.³ A24C 5/52, 5/58; A24D 1/02, 3/18

U.S. Cl. 131—202 21 Claims



20. A filter cigarette produced from

a filter element,

a tobacco unit,

a porous or perforated sheathing strip,

a connecting strip, and

adhesive material, by

applying the adhesive material to a portion of the sheathing strip along a set of first coating tracks in a preset direction.

subsequently adhesively wrapping the sheathing strip around the filter element, so as to constitute therewith a filter unit, said filter unit having a longitudinal axis,

applying the adhesive material along portions of the connecting strip along a set of second coating tracks in a prearranged direction, and

thereafter joining said filter unit to said tobacco unit, said preset and prearranged directions forming a prearranged angle with one another, within a range from an angle somewhat greater than 0° to an angle somewhat less than 360°.

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4,303,081

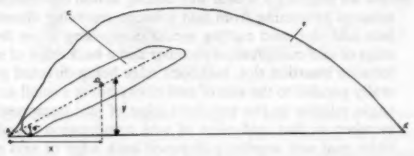
## PROCESS FOR LAYING OUT A MAXIMUM NUMBER OF WRAPPERS FOR CIGARS IN A LEAF OR HALF-LEAF OF TOBACCO

Jean-Francois Leclerc, Orleans; Jacques Paret, Fleury-les-Aubrais, and Pierre Waegaert, Bordeaux, all of France, assignors to Service d'Exploitation Industrielle des Tabacs et des Allumettes, Paris, France

Filed Jan. 31, 1980, Ser. No. 117,291

Int. Cl.³ A24C 1/00, 1/04

U.S. Cl. 131—282 5 Claims



1. A process for laying out a maximum number of cigar wrappers in a leaf or half-leaf of tobacco, the position of each wrapper being located within the leaf or half-leaf by two series of variables which are, on the one hand, the abscissa or ordinate from the center of the wrapper plotted with respect to the main direction of the leaf and to one end of the leaf, and on the other hand, the angle that the main direction of the wrapper makes with the main direction of the leaf, said process comprising the steps of laying out a first wrapper so that it is tangential to the contour of the half-leaf and one of its said variables is maximum or minimum, and then successively laying out other wrappers, each of them being always tangential to the last laid out wrapper and to the contour of the half-leaf or to another laid out wrapper and having one of its said variables maximum or minimum.

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4,303,082

## MANUALLY OPERATED CIGARETTE MAKING MACHINE

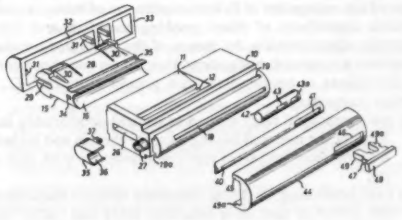
David K. Thompson, and David Crisp, both of London, England, assignors to Rizla Limited, Glamorganshire, Wales

Filed Dec. 19, 1978, Ser. No. 971,104

Claims priority, application United Kingdom, Dec. 21, 1977, 53244/77

Int. Cl.³ A24C 5/40, 5/42

U.S. Cl. 131—75 2 Claims



1. A manually operated cigarette making machine comprising in combination:

an elongate body having an internal groove including a first semi-cylindrical face directed longitudinally of said body;

a compression member slidable in said groove and having a front end profiled to define a second semi-cylindrical face, and a first operating handle directly connected to said

compression member for moving said compression member transversely between a first position in which said first and second semi-cylindrical faces are spaced apart to define with adjoining regions of said body a tobacco receiving chamber and a second position in which said semi-cylindrical faces abut to define a cavity for compressed tobacco;

a nozzle projecting from said body and communicating with said cavity for supporting a preformed cigarette tube;

means for ejecting a charge of compressed tobacco from said cavity through said nozzle into said cigarette tube;

portions of a top face of said body defining a tobacco insertion slot communicating with said tobacco receiving chamber when said compression member is in said first position; and

means for exerting a scissor-like cutting action on strands of tobacco projecting from said tobacco receiving chamber into said slot, said cutting means comprising a top front edge of said compression member and a back edge of said tobacco insertion slot, said back edge being directed generally parallel to the axis of said cavity but at a small acute angle relative to the top front edge of said compression member so that said edge of said compression member slides past said angularly disposed back edge of said slot during travel of said compression member from said first to said second position thereby cleanly severing the projecting tobacco strands;

portions of the top face of the compression member behind the top front edge thereof being recessed to define a waste vent groove for reception of cut strands of tobacco.

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**4,303,083**

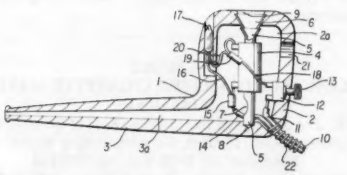
## DEVICE FOR EVAPORATION AND INHALATION OF VOLATILE COMPOUNDS AND MEDICATIONS

**Robert P. Burruss, Jr., 6433 79th St., Cabin John, Md. 20731**

**Filed Oct. 10, 1980, Ser. No. 196,058**

**Int. Cl.³ A24F** *5/00, 5/04*

**U.S. Cl. 131—271** **1 Claim**



1. A device for inhaling a mixture of air and vaporized volatile compounds, but without combustion or thermal degradation and pyrolysis of the volatile compounds, for the purpose of the enjoyment of flavor constituents of tobacco and the volatile ingredients of other smoking materials and for the systemic administration, by means of the respiratory route, of synthetic and natural medications that have a vapor pressure of 1 atmosphere at temperatures not greater than 250° C., the device comprising:

a main structural body shaped to be held comfortably in the hand of the user and having a cavity therein and including a mouthpiece and stem that communicates with said cavity;

a heat-generating electrical resistance element suspended in the cavity of said main structural body and out of direct contact with the walls of said cavity;

a surface to be heated in direct thermal contact with said heat-generating electrical resistance element and in indirect thermal contact, and direct mechanical contact, with said main structural body;

a funnel which receives the volatile compounds to be evaporated and directs the flow of said volatile compounds while in their liquid state into the central portion of said surface, and which mechanically connects said surface with the main structural body and thereby supports the surface in the cavity of said main structural body;

air passages communicating with the stem and mouthpiece portions of said main structural body and so arranged that the air that moves through the device may entrain the vapors of the evaporated volatile compounds so that a mixture of air and vaporized volatile compounds can be inhaled through the mouthpiece portion of said main structural body;

a vent hole bored substantially horizontally into the cavity of said main structural body, said vent hole being conveniently placed so that the user of the invention may partially or totally cover said vent hole with a finger or other portion of the hand and thereby effect control over the ratio of air to evaporated volatile compounds thence inhaled through the mouthpiece portion of said main structural body;

a combined on-off switch and variable power control mechanism whereby the user of the invention can adjust the temperature of the surface, said combined switch and control mechanism being conveniently and aesthetically attached to and projected through and into the cavity of said main structural body in such a way that the electrical wires that connect with said combined switch and control mechanism will be connected with the combined switch and control mechanism inside of said cavity, while the portions of the combined switch and control that are to be manipulated by the user of the invention project beyond the outer surface of said main structural body;

an indicator lamp contained within the main structural body, but so located as to be easily visible to the user, said indicator lamp serving the function of indicating to the user of the invention that the heat-generating electrical resistance element is receiving electrical power and thereby generating heat for said heated surface; and

a double-wire power cord that projects through a hole in the main structural body and connects, inside of the cavity of said main structural body, with the heat-generating electrical resistance element, the indicator lamp, and with the combined on-off switch and power control mechanism, and which at its extreme end away from the main structural body, has a plug means for connection with an electrical power source.

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**4,303,084**

## SELF-EXTINGUISHING CIGARETTES

**Eli Simon, 7175 Little Harbor Dr., Huntington Beach, Calif. 92648**

**Filed Jul. 14, 1980, Ser. No. 168,122**

**Int. Cl.³ A24D** *1/02, 1/10, 1/12*

**U.S. Cl. 131—349** **4 Claims**

1. A self-extinguishing cigarette comprising a paper wrapper enclosing a charge of tobacco or smoking medium wherein a carboxylated vinylidene chloride-butadiene copolymer latex having a chlorine content of approximately 36% has been applied to the wrapper so as to be uniformly distributed in an amount effective so as to cause said cigarette to self-extinguish when lit and left unattended.

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**4,303,085**

## SYSTEM AND METHOD FOR HAIR TREATMENT

**Mario de la Guardia, Savannah, Ga., and Donald R. Cowsar, Birmingham, Ala., assignors to Carson Products Company, Savannah, Ga.**

**Continuation-in-part of Ser. No. 805,149, Jun. 9, 1977. This application Feb. 11, 1980, Ser. No. 120,091**

**Int. Cl.³ A45D** *7/00*

**U.S. Cl. 132—7** **15 Claims**

1. A method of treating hair to cause the hair to maintain a desired configuration, said method comprising contacting the hair while in said desired configuration with an effective amount of an aqueous composition comprising the product

formed by mixing in an aqueous medium at least one water-soluble quanidine salt in solution in said aqueous medium in an amount of greater than 0.25 molar in quanidine and an effective amount of at least one particulate, strong-base, quaternary ammonium, hydroxide-form ion-exchange resin, wherein said resin has an affinity for the anion of said quanidine salt which is at least equal to the affinity of the resin for the hydroxyl ion, and removing said composition from the hair after said composition has been in contact with the hair for an effective time.

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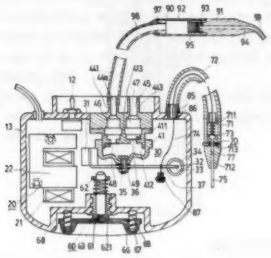
**4,303,086**

## PORTABLE MULTI-FUNCTION APPARATUS

**Cheng C. Wang, Room 3, 11th Fl., 311, Sec. 4, Chung-Hsino-East Rd., Taipei, Taiwan**

**Filed Sep. 8, 1980, Ser. No. 185,143**
**Int. Cl.³ A45D *29/05***
**U.S. Cl. 132—73.6** **6 Claims**



1. A multi-function apparatus which comprises
a casing having a plurality of through holes; means provided in said casing for producing an alternating magnetic field;
oscillating means mounted on an inner wall of said casing and actuated by the induced alternating magnet field;
means driven by said oscillating means and communicated with at least two of the through holes of said casing for sucking and exhausting fluid;
means mounted movably on said casing and oscillated by said oscillating means for performing the function of massage;
a cleaning device communicated with the suction through hole of said casing for performing the function of cleaning by operation of said suction and exhaust means; and
means connected with and actuated by said oscillating means for filing one's nails.

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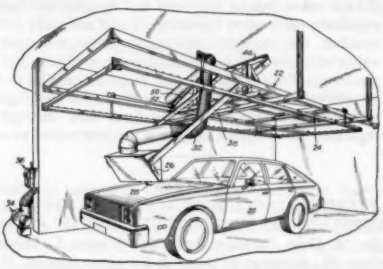
**4,303,087**

## AUTOMOBILE WASHING AND DRYING INSTALLATION

**Michael Flaxman, 169 Sterling Rd., Harrison, N.Y. 10528**

**Filed Oct. 19, 1979, Ser. No. 86,413**
**Int. Cl.³ B08B *3/02*; B60S *3/04***
**U.S. Cl. 134—58 R** **14 Claims**

1. Apparatus for washing an object resting on a supporting surface, said apparatus comprising a frame, spray means for discharging a cleaning fluid against said object, raising and lowering means connecting said spray means to said frame for raising and lowering said spray means, means for supplying cleaning fluid to the spray means, drying means supported by said frame for directing a drying medium against said object, and control means to control the application of said drying medium to said object, said drying means including a hood adapted to rest against said object, pivot means pivotally supporting said hood from said frame, counterbalance means coupled to said hood to counterbalance the weight of the hood and minimize the force of the hood against said object, and pneumatic medium source means coupled to said hood to supply pneumatic medium to the same, said pivot means including parallel arms connected to said hood and pivots supporting said arms from said frame, said counterbalance means including at least one counterweight bar extending across said arms, said spray means including a shroud suspended from said frame and adapted for at least partly encircling said object, piston means coupled to said frame and said hood for selectively displacing the hood relative to said object, a source of pressure medium for operating said piston means, and operating means for effecting a sequence of operations including lowering the shroud, supplying cleaning fluid to said shroud, supplying drying medium to said hood, actuating said piston means to raise said hood, and raising said shroud.



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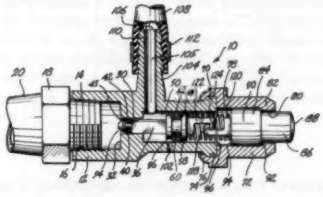
**4,303,088**

## PNEUMATIC VALVE AND REGULATOR ASSEMBLY

**Charles J. Green, Vashon, and Alan K. Forsythe, Burton, both of Wash., assignors to Sprague Devices, Inc., Michigan City, Ind.**

**Filed Jun. 7, 1979, Ser. No. 46,268**
**Int. Cl.³ F16K *11/02***
**U.S. Cl. 137—102** **7 Claims**



1. A normally-closed gas valve and pressure regulator assembly which is actuated to open and to automatically provide regulated pressure for fluid obtained from a pressure source and delivered to a utilization device and which when not actuated provides connection of the utilization device to a vent, the assembly comprising:
a valve housing having an axis along which a series of bores are formed, the housing having an inlet bore formed along the axis and adapted to be connected to the pressure source, a regulator valve bore formed along the axis adjacent to the inlet bore with a diameter smaller than the inlet bore, a vent bore formed along the axis adjacent to the regulator valve bore, and an outlet and a vent aperture opening through said housing from said vent valve bore;
a pressure regulator valve shiftable axially in said regulator valve bore;
a vent valve shiftable axially in said vent valve bore;
means to apply axially directed force from a manually actuable member to said regulator valve and vent valve through a resiliently biased limiting lost motion link, said link including a pair of interlinked members axially extending respectively from the vent valve and from said manually actuable member, each of the interlinked members being surrounded by a spring exerting forces thereon

to extend the link and having means to limit travel therebetween;

said pressure regulator valve being urged toward its closed position and said vent opened by pneumatic pressure in said inlet when said manually actuable member is inoperative;

said vent valve closing said vent and opening said pressure regulator valve upon operation of said manually actuable member, the increased pneumatic pressure in said vent valve bore directed against said vent valve together with pneumatic forces against said pressure regulator valve counterbalancing the axial forces applied to said regulator valve by said spring whereby fluid flow through said regulator valve is regulated to a predetermined pressure.

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**4,303,089**

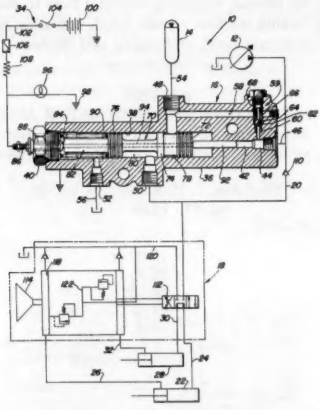
## STEERING INCLUDING ACCUMULATOR FOR SUPPLYING EMERGENCY RESERVE OF FLUID

**Douglas M. Gage, Dubuque, Iowa, and Warren L. Thompson, Galena, Ill., assignors to Deere & Company, Moline, Ill.**

**Filed Oct. 14, 1980, Ser. No. 196,199**

**Int. Cl.³ B62D *5/08***

**U.S. Cl. 137—113** **1 Claim**



1. A reserve fluid supply system, comprising: a reserve fluid control valve including a valve bore having first and second ends; a plug being in the first end of the bore and including a first switch contact; a valve spool shiftably mounted in the bore and including a first end portion defining a second switch contact located for engagement with the first contact when the valve spool is in a normal operating position; a first passage extending axially into the second end of the bore and having an end portion defining an inlet port remote from the bore; a pin reciprocably mounted in the first passage and having one end engaged with the valve spool and an opposite end exposed to the inlet port; a source of fluid pressure connected to the inlet port; a fluid consumer circuit connected to the source of fluid pressure; first and second ports intersecting the bore between the first and second ends of the bore; and accumulator connected to the first port; said fluid consumer circuit being connected to the second port; a spring mounted in the bore between the first end of the latter and the valve spool and biasing the spool towards the second end of the bore; said pin and spring cooperating to permit the valve spool to shift from its normal operating position toward the second end of the bore to a reserve fluid supplying position only upon the pressure at the inlet port falling to a predetermined minimum value; an indicator circuit means embodying the first and second contacts and including an indicator means which becomes energized whenever the contacts become disengaged from each other; and said valve spool including land means for preventing fluid flow between the first and second ports when the spool is in its normal operating position and for establishing a fluid flow path between the first and second ports when the spool is in its reserve fluid supplying position.

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**4,303,090**

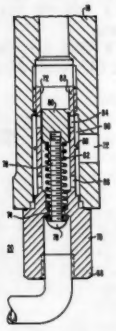
## CRANKCASE OIL RETURN VALVE

**Donald K. Mayer, Bloomington, Minn., assignor to Thermo King Corp., Minneapolis, Minn.**

**Filed Mar. 18, 1980, Ser. No. 131,306**

**Int. Cl.³ F16K *31/12***

**U.S. Cl. 137—114** **2 Claims**



1. A valve including:

an outer body and an interior sleeve with an axially extending bore, said body and sleeve defining an annular chamber therebetween;

a primary and a secondary fluid inlet at opposite axial ends of the valve to receive fluid from a primary source and a separate secondary source;

axially movable valving means in the bore including a valve stem having one valving element at its head end and a plunger at its other end;

an annular shoulder in said sleeve forming a valve seat for said valving element;

said sleeve includes first and second radial valve port means interconnecting said bore with said annular chamber, said plunger being movable between positions opening and closing said first port means;

means biasing said valving means as a unit in a direction to seat said valving element of the valve stem and to locate said plunger in a position closing said first radial port means, and in opposition to primary fluid pressure tending to move said valving means axially toward an open position; and

a single fluid outlet in said body communicating with said annular chamber to receive all of the flow from both the primary and secondary sources when said valving means is open.

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**4,303,091**

## HYDRAULIC CONTROL APPARATUS FOR LOAD INDEPENDENT FLOW REGULATION

**Siegfried Hertell, Radevormwald; Claus Kirchherr, Remscheid, and Horst Kahl, Wermelskirchen, all of Fed. Rep. of Germany, assignors to Barmag Barmer Maschinenfabrik, Remscheid, Fed. Rep. of Germany**

**Filed Feb. 27, 1980, Ser. No. 125,096**

**Claims priority, application Fed. Rep. of Germany, Mar. 1, 1979, 2908018**

**Int. Cl.³ F15B *13/04***

**U.S. Cl. 137—117** **5 Claims**

1. A flow control apparatus adapted to provide load independent flow regulation in a hydraulic power system or the like, and characterized by the ability to minimize the idling

power consumption of the pump when the load is removed from the system, and comprising,

a housing having a cylindrical bore therein, said bore having closed opposite ends so as to define first and second opposite end portions,

a pump inlet channel, a sump outlet channel, and a consumer channel, all communicating with said bore in said housing,

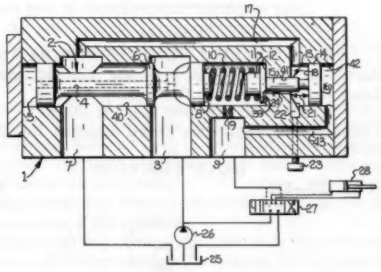
a balance piston slidably disposed in said bore and movable between a bypass or idling position wherein fluid flows from said pump inlet channel through said bore to said sump outlet channel, and an operating position wherein such flow is precluded,

means for conducting fluid from said pump inlet channel into said first end portion of said bore and so as to act against a first end of said piston to urge the piston in a direction toward its bypass position,

means for urging the piston in the opposite direction and toward its operating position, and including

(a) first passageway means for conducting fluid from the consumer channel into said second end portion of said bore and so as to act against the second end surface of the piston, and

(b) a spring disposed in said second end portion of said bore and having one end thereof disposed in contact with the second end of said piston,



a differential piston slidably mounted in a cavity in said housing which is aligned with said bore and adjacent said second end portion thereof, said differential piston having an end of relatively large diameter disposed in said cavity and facing away from said spring, and an end of relatively small diameter extending through a passage in said housing and communicating with said bore and operatively engaging the other end of said spring, and

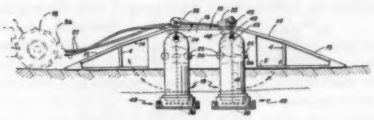
second passageway means for conducting fluid from said consumer channel into said cavity and so as to act against said relatively large end of said differential piston, said second passageway means being parallel to said first passageway means for conducting fluid from the consumer channel into said cavity independently of the fluid flow directed through said first passageway means, and whereby the differential piston is moved toward said spring by the pressure of the fluid in the consumer channel to amplify the force of the spring acting against the balance piston, and the amplifying force is removed when the pressure in the consumer channel is removed to thereby minimize the pressure of the fluid in the pump inlet channel which is required to move the balance piston to the bypass position.

**4,303,092**

## SIPHONIC IRRIGATION APPARATUS

**John K. Logan, Oakville, Narrabri, New South Wales, Australia (2390)**

**Filed Nov. 5, 1979, Ser. No. 91,535**
**Int. Cl.³ F04F *10/00***
**U.S. Cl. 137—142** **5 Claims**



1. Siphonic apparatus comprising a chassis, at least one siphonic tube mounted on said chassis with a main axis extending generally horizontally and having an inlet portion and an outlet portion which normally extend generally downwardly from the horizontal axis and from either side of the chassis, means mounting the tube rotatable on the chassis about the horizontal axis, said chassis having an hydraulic cylinder affixed thereon, the cylinder having an operating rod connected to a cable which is passed about the tube, the tube being actuated by the hydraulic cylinder to cause the tube to partially rotate on the chassis radially about its horizontal axis to move the inlet and outlet portions thereof simultaneously upwardly clear of a surface supporting the chassis, said tube having a suction valve located adjacent to its inlet portion and a valve to selectively open and close its outlet portion.

4. Siphonic apparatus comprising a bridging structure formed by a chassis fabricated from longitudinal top and bottom members interconnected to form a rigid structure having an elevated central section and downwardly angled end sections terminating at generally the same plane as a surface supporting said chassis, the top members having decking fixed thereon and constituting a trackway to support a vehicle being driven over the bridging structure, at least one siphonic tube in the chassis beneath the decking having an inlet portion and an outlet portion which extend downwardly on either side of the chassis, said tube having a suction valve located adjacent to its inlet portion and a valve to selectively open and close said outlet portion.

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**4,303,093**

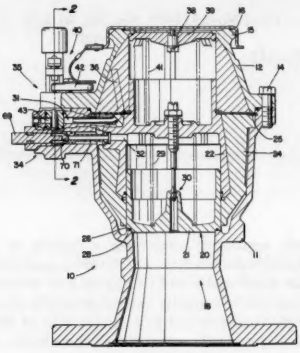
## HYDRANT VALVE

**Henry A. Swindler, Tustin, Calif., assignor to Parker-Hannifin Corporation, Cleveland, Ohio**

**Filed Nov. 15, 1979, Ser. No. 94,604**
**Int. Cl.³ F16K *37/28, 31/12***
**U.S. Cl. 137—315** **5 Claims**

1. A hydrant valve wherein fuel flow through the valve is prevented upon partial disassembly of the valve for service procedures, comprising a valve body, an adaptor cap secured to said valve body by a plurality of bolts, a piston and cylinder main valve arrangement for controlling fuel flow at the inlet of said valve body, said piston being urged to the valve closed position by fluid under pressure within said cylinder, means to allow said fluid flow into said cylinder, means for exhausting pressure in said cylinder to allowing said piston to move to a valve-open position in response to inlet fluid pressure, said exhaust means comprising a bore in fluid communication with said cylinder for venting said cylinder downstream of said valve inlet, a check valve in said bore, said check valve being normally biased to a closed position to prevent flow of fluid through said bore, an actuator releasably mounted on said valve body, said actuator being operable to control flow of fluid through said main valve and comprising a plunger engageable with said check valve for moving said check valve to an open position to allow flow of fluid through said bore, and mounting means for releasably securing said actuator on said valve body, said mounting means further comprising interlock

means operatively associated with said mounting bolts for said adaptor cap to prevent removal of at least one of said bolts



prior to removal of said actuator, whereby removal of said adaptor cap is prevented without release of said mounting means and said actuator to provide closure of said check valve.

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**4,303,094**

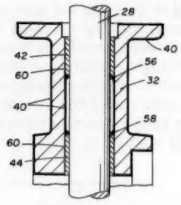
**CORROSION RESISTANT VALVE CONSTRUCTION**

**Thomas F. Rothwell, and Gerald B. Smith, both of Bradford, Pa., assignors to Dresser Industries, Inc., Dallas, Tex.**

**Filed May 19, 1980, Ser. No. 151,222**

**Int. Cl.³ F16K** *1/22*

**U.S. Cl. 137—375** **5 Claims**



**1.** In a pipe line valve for corrosive service including a metal body defining a flow passage between an inlet and an outlet, a closure member in said passage operable between open and closed positions thereof, an operator shaft extending from a driving connection with said closure member to a location external of said body, means defining at least one bore through a wall of said body for accommodating said operator shaft, and a corrosion resistant coating adhering in a bond relation to said valve body on at least the wall surface of said shaft bore, the improvement comprising bearing means within said shaft bore separate from said shaft and in a position contiguous the coating in contact therewith for supporting said operator shaft for rotation.

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**4,303,095**

**LOW-DIFFERENTIAL PRESSURE DELAY VALVE**

**John A. Aubel; William H. Bose, and James H. Burrows, all of Decatur, Ill., assignors to Borg-Warner Corporation, Chicago, Ill.**

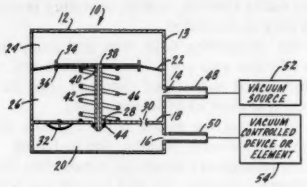
**Filed Jun. 2, 1980, Ser. No. 155,241**

**Int. Cl.³ F16K** *17/18;* **F02M** *3/00*

**U.S. Cl. 137—493.8** **11 Claims**

**1.** A low-differential pressure delay valve, comprising:

a wall structure defining an enclosure, a separating plate mounted in the enclosure to define an input chamber and an output chamber, which separating plate defines a port and an aperture between the input and output chambers, an umbrella valve mounted in the separating plate, a diaphragm operator mounted in the enclosure to define a third chamber adjacent the input chamber and to separate and seal the input and third chambers from each other, side wall structure defining an input port for the input chamber to provide an input connection, said wall structure also defining an output port for the output chamber to provide an output connection, a hollow stem with a sealing means affixed near one end thereof, which stem extends through the separating plate port, through the input chamber, and through the diaphragm operator into the third chamber, and a bias spring with a known bias force, positioned in one of the input and third chambers, effective to bias the diaphragm operator to close the separating plate port with the sealing means when the pressure difference between the input and output chambers less than the bias force of the spring.

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**4,303,096**

**VALVE FOR FUEL PUMPING APPARATUS**

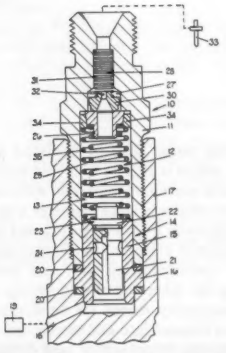
**Robert T. J. Skinner, High Wycombe, England, assignor to Lucas Industries Limited, Birmingham, England**

**Filed Oct. 31, 1980, Ser. No. 202,759**

**Claims priority, application United Kingdom, Jan. 18, 1980, 1802/80**

**Int. Cl.³ F16K** *15/06*

**U.S. Cl. 137—512** **3 Claims**



**1.** A combined delivery valve and damping valve unit for connection in use, between an outlet of a high pressure fuel injection pump and a pipeline which leads to the associated fuel injection nozzle of a fuel system for a compression ignition engine, the valve unit comprising an elongated body having a stepped bore defined therein, a delivery valve assembly located in the wider portion of the bore, a spring abutment engaging a step defined between the wider portion of the bore and a reduced portion thereof, a damping valve member located in the reduced portion of the bore, a seating defined on said spring abutment for engagement by said damping valve member, said spring abutment having a peripheral surface

which tapers outwardly towards said step, at least one locking member having a wedge section located between said tapered surface and the wall of the bore and resilient means biassing said locking member towards said step.

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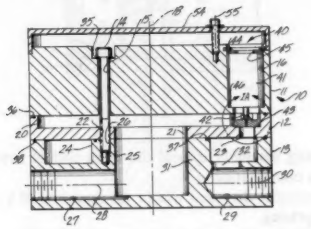
**4,303,097**

## DIGITAL FLUID FLOW CONTROL APPARATUS

**Lawrence G. Zerby, Mission Viejo, Calif., assignor to Powell Industries, Inc., Houston, Tex.**

**Filed Nov. 19, 1979, Ser. No. 95,292**
**Int. Cl.³ G05D *7/03***
**U.S. Cl. 137—599** **28 Claims**



1. Digital fluid flow control apparatus comprising:
a generally cylindrical valve body having a cylindrical axis;
an inlet port to the valve body having an axis;
an outlet port from the valve body having an axis;
a cylindrical manifold coaxially disposed in the valve body in laterally displaced relationship with at least one of the ports;
an annular manifold coaxially disposed in the valve body in laterally spaced relationship with the cylindrical manifold, the annular manifold lying between the cylindrical manifold and the inlet and outlet ports and surrounding a portion of the valve body;
a passage extending through the valve body from the inlet port to one of the manifolds;
a passage extending through the valve body from the outlet port to the other manifold, the passage to the cylindrical manifold passing through the portion of the valve body surrounded by the annular manifold; and
a plurality of digital bistable valve elements connecting the cylindrical manifold and the annular manifold.

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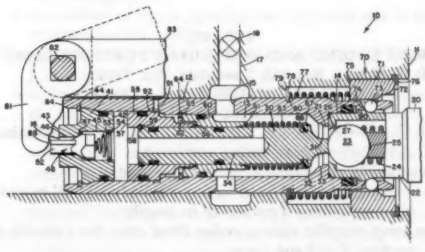
**4,303,098**

## FEMALE COUPLER

**Aloysius C. Shindelar, Hudson, Iowa, assignor to Deere & Company, Moline, Ill.**

**Filed Apr. 14, 1980, Ser. No. 139,878**
**Int. Cl.³ F16L *37/28*; F15B *13/042***
**U.S. Cl. 137—614.06** **18 Claims**



7. A female coupler for coupling to and uncoupling from a male coupler which has a movable male check member positioned at the end of a hose, said female coupler comprising:
(a) a housing;
(b) a movable receptacle contained in said housing comprising a main cavity with an interior valve seat, an inlet and an outlet port communicating with said main cavity, and an engagement bore connected to said main cavity by a passageway, said engagement bore capable of receiving said male coupler;
(c) movable main valve means situated within said main cavity for controlling the flow of fluid between said main cavity and said engagement bore, said movable main valve means comprising a valve member with a passage communicating between said inlet and outlet ports, an elongated stem positioned at one end of said valve member capable of projecting into said engagement bore and contacting said male check member, and a beveled surface formed on said valve member adjacent to said elongated stem, said beveled surface capable of mating with said interior valve seat of said receptacle for blocking said passageway; and
(d) piston means movably positioned within said main cavity between said main valve means and said outlet port for assisting in moving said main valve means against excessive pressures contained in said male coupler when said outlet port is closed, said piston means having a first surface on which said fluid can impinge and a second surface which contacts said main valve means.

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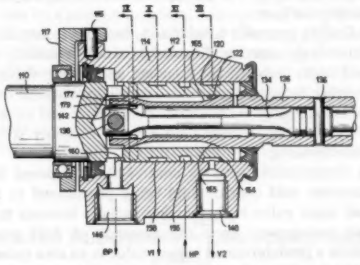
**4,303,099**

## DEVICE FOR HYDRAULICALLY ASSISTED STEERING

**Gilbert Kervagoret, Argenteuil, France, assignor to Societe Anonyme DBA, Paris, France**

**Filed Oct. 24, 1979, Ser. No. 87,850**
**Claims priority, application France, Oct. 27, 1978, 78 30653; Jun. 25, 1979, 79 16315**
**Int. Cl.³ B62D *5/08***
**U.S. Cl. 137—625.21** **9 Claims**



1. A device for hydraulically assisted steering of a motor vehicle comprising a steering control member (**110**) extended by a regulator sleeve (**120**), a rotor (**126**) of generally tubular form arranged inside the sleeve (**120**), a torsion-bar (**134**) housed inside the rotor and having one end fixed to the rotor and the other end fixed to the steering control member and a hydraulic circuit for generating a control quantity in response to an angular displacement imposed upon the rotor, characterized by the fact that the regulator sleeve (**120**) includes a first group of two pairs of diametrically opposed passage means (**161, 163**), the pairs being offset axially and angularly, the rotor (**126**) includes a second group of two pairs of passage means (**165, 167**), each passage means (**165** or **167**) of said second group being shaped such that it can communicate with two passage means (**161, 163**) belonging to two different pairs of said first group, a source of high pressure (**HP**) and a drain (**179, 160**) being permanently connected to a pair of passage means (**165, 167**) of one group, respectively, the arrangement being such that an angular displacement $\theta$ of the rotor (**126**) causes an unbalance $\Delta p$ between the respective pressures pre-

vailing in the pairs of passage means (161, 163) of the other group, and the edges of passage means (161, 163) of the first group directed along the axis of the sleeve have a non-rectilinear profile defined as a function of the characteristic $\Delta p = f(\theta)$.

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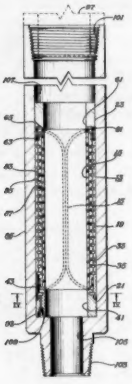
4,303,100

## KELLY VALVE

Gerald F. Kalb, Fort Worth, Tex., assignor to Geosource Inc., Houston, Tex.

Filed Dec. 18, 1978, Ser. No. 970,192
Int. Cl.[3] F16K *15/14*
U.S. Cl. 137—853 3 Claims



1. A pressure responsive kelly valve assembly comprising:

a. an annular outer valve body member having a cylindrical interior surface;

b. a flexible generally tubular and elastomeric annular inner valve body member disposed generally coaxially within said outer valve body member, said inner valve body member defining a passageway radially inwards thereof;

c. means merging end portions of said outer and inner valve body members whereby an annular chamber is formed therebetween;

d. a compressible gaseous control fluid disposed in said chamber, said control fluid being pressurized to extend said inner valve body member radially inwards to close said passageway upon the presence of fluid pressures below a predetermined release value in an area external to said chamber and axially adjacent said passageway, said control fluid further being compressible upon the presence of fluid pressures greater than or equal to said release value in such area to permit said inner valve body member to move radially outwards in response to such fluid pressures to open said passageway;

e. a backup liner interposed between said outer and inner valve body members, with said backup liner having cylindrical exterior and interior surfaces having passage means for permitting flow of said control fluid to and from the liner interior and with said backup liner exterior surface being provided lands and grooves;

f. said inner valve body further having annular flanged end portions shaped to conform with the end portions of said backup liner and bonded to end portions of the backup liner exterior surface; and

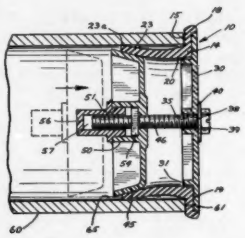
g. said means merging end portions of said outer and inner valve body member being a means clamping said inner valve body annular flanged end portions between said backup liner end portions and said outer valve body member.

4,303,101

## END PLUG ASSEMBLY FOR SEWER PIPE

James W. Tholen, 638 11th Ave. S., Hopkins, Minn. 55343

Filed Apr. 14, 1980, Ser. No. 139,808
Int. Cl.[3] F16L *55/10*
U.S. Cl. 138—89 7 Claims



1. A plug assembly to seal the open end of a sewer pipe, having in combination

a seal member disposed within the open end of a sewer pipe comprising,

a rim portion forming an annular flange having underlying rib-like sealing projections,

a sleeve integral at one end portion with said rim portion, and

a flared end portion forming the other end portion of said sleeve,

a rigid disc member disposed upon said rim portion,

a bolt being received within said disc

a wedge member drawn into the flared end portion of said sleeve,

said wedge member having thread means therein receiving said bolt and being drawn by said bolt into said flared end portion of said sleeve expanding the same for sealing engagement with the adjacent inner surface of said pipe and simultaneously causing said disc to compress said rim portion into sealing engagement with the adjacent end wall of said pipe, and

said wedge member having a sealed chamber to receive the end portion of said bolt threaded thereinto.

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4,303,102

## HOSE ENDING AND METHOD OF FORMING SAME

Dale G. Hugley, Box 465, Kennedale, Tex. 76060

Filed Mar. 17, 1980, Ser. No. 130,815
Int. Cl.[3] B65D *59/02, 59/06*
U.S. Cl. 138—96 R 6 Claims

1. An improved hose ending comprising:

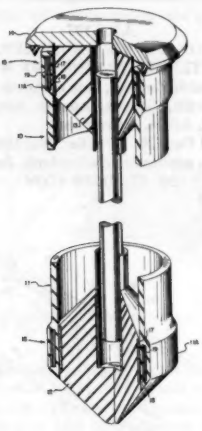
a generally cylindrical hose having an end;

an end piece for said hose, having a cylindrical wall extending over at least a portion of its length;

an inner metallic unitary collar fitted onto the cylindrical portion of said end piece;

said end piece and inner collar being fitted into said hose end;

a multi-segment collar fitted over said hose end in position to overlie said end piece and inner collar; and



an outer collar fitted over said multi-segment collar to urge it against said hose.

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4,303,103

## INTERNAL SLEEVE SEAL AND METHOD OF USE

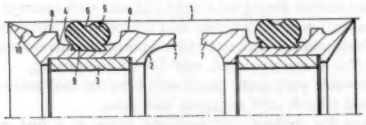
**Helmuth Marks, Maulbeerallee 54, 1000 Berlin 20, and Wilhelm Fischer, Dubrowstrass 4, 1000 Berlin 37, both of Fed. Rep. of Germany**

**Filed Mar. 29, 1979, Ser. No. 25,142**

**Claims priority, application Fed. Rep. of Germany, Mar. 31, 1978, 2814497**

**Int. Cl.³ F16L *55/18***

**U.S. Cl. 138—97** **10 Claims**



1. An internal sleeve seal for sealing a localized discontinuity in a pipeline, the seal comprising,

a tube-shaped pliable collar member having annular locating means defined thereon adjacent the end portions thereof, the locating means being adapted to extend radially outward to engage the interior surface of a pipeline,

at least two recessed portions defined circumferentially around the collar at axially spaced positions and between the locating means,

a ring cushion of elastic, gumlike material positioned in each recessed portion, and

means to radially expand the collar member at the recessed portions,

whereby, the collar member may be moved axially through the pipe with the locating means engaging the interior of the pipe and positioned at the discontinuity to be sealed with a ring cushion positioned substantially within the recessed portions on either side of the discontinuity, whereupon the collar may be radially expanded at the recessed portions to urge the ring cushion into contact with the interior of the pipeline while containing the ring cushion within the associated recessed portion to seal the discontinuity.

4,303,104

## DOUBLE-WALL PLASTIC TUBING IN WHICH THE OUTER WALL HAS TRANSVERSE CORRUGATIONS AND THE INNER WALL IS SMOOTH

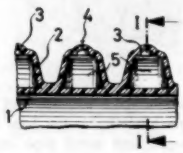
**Wilhelm Hegler, Goethe Str. 2, Bad Kissingen, Fed. Rep. of Germany (873), and Ralph-Peter Hegler, Bad Kissingen, Fed. Rep. of Germany, assignors to Wilhelm Hegler, Fed. Rep. of Germany**

**Continuation of Ser. No. 967,807, Dec. 8, 1978, abandoned, which is a division of Ser. No. 823,778, Aug. 11, 1977, Pat. No. 4,145,387. This application Jun. 2, 1980, Ser. No. 155,899**

**Claims priority, application Fed. Rep. of Germany, Aug. 24, 1976, 2637995**

**Int. Cl.³ F16L *11/06***

**U.S. Cl. 138—121** **5 Claims**



1. A double-wall plastic tube whose outer tube has annular transverse corrugations and whose inner tube is smooth, said outer tube having wart-like elevations having an opening therethrough, said outer tube and said inner tube being fused together, prepared by a process comprising extruding two tubes from two concentrically disposed annular dies, the outer tube being carried between two oppositely circulating sets of mold halves which join together along their path to define whole molds, the molds being provided with annular depressions and elevations and the outer plastic tube being made to conform to the molds by a pressure differential whereby it obtains annular transverse corrugations and an inner tube is extruded from the inner annular die to engage and fuse to the outer tube by a pressure medium, said opening being formed in said outer tube, or between said inner tube and said outer tube before said inner tube has hardened, said opening communicating with the region defined between the wall of said annular corrugation and said inner tube with the next adjacent region defined by the wall of a next adjacent corrugation and said inner tube or with the exterior beyond said outer tube and thereafter cooling the double-walled tube to harden said inner tube.

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4,303,105

## INSULATED TRANSMISSION LINE FOR CRYOGENIC MEDIA

**Peter Rohner, Isernhagen, Fed. Rep. of Germany, assignor to Kabel-und Metallwerke Gutehoffnungshuette AG, Hanover, Fed. Rep. of Germany**

**Filed Apr. 24, 1980, Ser. No. 143,193**

**Claims priority, application Fed. Rep. of Germany, Sep. 28, 1979, 7927533[U]**

**Int. Cl.³ F16L *9/18***

**U.S. Cl. 138—149** **9 Claims**

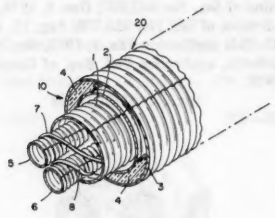
1. Insulated transmission line for the transfer of cryogenic media, comprising:

a tubular heat shield, including at least three concentric, radially separated, corrugated metallic tubular members, that provides a first annular space between two of said tubular members wherein a multiple layer, fibrous insulating material is disposed under vacuum conditions; a second annular space between two of said tubular members, including the innermost of said tubular members, having disposed therein a liquid or gaseous cooling madia; and a vacuum sealed, inner tubular space formed by said innermost tubular member; the improvement comprising:

first and second longitudinally seam welded, corrugated

metal pipes extending through said vacuum sealed, inner tubular space; and

first insulating spacer means positioned about said first metal pipe and at least partially between said first and second metal pipes for maintaining a spacial separation and minimum heat conductance between said metal pipes throughout their respective axial lengths, and second insulating spacer means positioned about at least said second metal pipe and between said metal pipe and said innermost tubular member for maintaining spacial separation and minimum heat conductance between said metal pipe and said innermost tubular member throughout their respective axial lengths.



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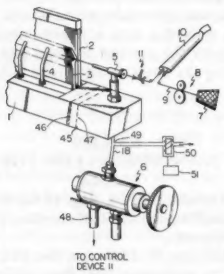
**4,303,106**

## METHOD AND APPARATUS FOR CARRYING OUT THE FILLING OPERATION IN A JET LOOM

**Kazunori Yoshida, Nagoya; Fuzio Suzuki, Toyota; Hiroshi Arakawa, Kariya, and Takeshi Kobayashi, Aichi, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho and Kabushiki Kaisha Toyota Chou Kenkyusho, both of Aichi, Japan**

**Filed Sep. 12, 1979, Ser. No. 74,813**
**Claims priority, application Japan, Sep. 18, 1978, 53/114244**
**Int. Cl.[3] D03D *47/30***
**U.S. Cl. 139—435** **12 Claims**




1. In a jet loom provided with a plurality of guide members disposed in an alignment on a sley to form a fluid and weft guide passage, a fluid jetting main nozzle directed to said guide passage and a transfer valve which is connected to the main nozzle so that at the filling time a flow of compressed fluid is started to the main nozzle and a volume of a compressed fluid is accumulated between the main nozzle and the transfer valve, and a fluid is jetted from the main nozzle, and after the filling operation, jetting of the fluid is stopped, the improved filling method comprising jetting the fluid from the main nozzle at the filling time, stopping the flow of compressed fluid to the main nozzle after the elapse of the time necessary for the filling operation, and simultaneously discharging the compressed fluid accumulated between the transfer valve and the main nozzle, whereby the fluid pressure in the main nozzle is promptly reduced.

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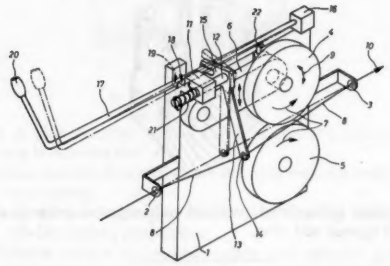
**4,303,107**

## SWITCHING ON DEVICE ON AN APPARATUS FOR INTERMITTENTLY TAKING OFF WEFT YARN

**Anton Lucian; Rudolf Zwiener, both of Arbon, Switzerland, and Siegfried Roehrich, Goetzis, Austria, assignors to Adolph Saurer Limited, Arbon, Switzerland**

**Filed Dec. 28, 1979, Ser. No. 108,299**
**Claims priority, application Switzerland, Jan. 4, 1979, 65/79**
**Int. Cl.[3] D03D *47/34***
**U.S. Cl. 139—450** **2 Claims**



1. A device for use on a shuttleless loom for deflecting yarn from between a pair of takeoff rolls during a portion of a first stroke of a weft inserter after startup of said loom so that said yarn can be drawn directly from a supply package and for automatically inserting said yarn between said takeoff rolls when said rolls are separated adjacent the end of said first stroke of said weft inserter so that on subsequent strokes of said weft inserter, measured lengths of yarn are taken off said package by said takeoff rolls and fed to a yarn storage device interposed between said takeoff rolls and said weft inserter;

a movable mounting supporting one of said takeoff rolls that are shifted during each stroke of said weft inserted from a takeoff position wherein said takeoff rolls withdraw yarn from said package to a release position wherein said takeoff rolls are separated, said device comprising;

a movable yarn guide positioned between said package and said takeoff rolls engaging said yarn;

means for shifting said movable guide to a first position deflecting said yarn outside of said takeoff rolls;

a blocking mechanism for holding said movable guide in said first position; and

means operably connected to said movable mounting for shifting said movable guide from said first position to a second position when said rolls are separated for inserting said yarn between said takeoff rolls so that said takeoff rolls can withdraw measured lengths of yarn from said package after said first stroke of said weft inserter.

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**4,303,108**

## HOT MELT ADHESIVE DISPENSING SYSTEM OF THE HAND HELD GUN TYPE

**Larry D. Akers; Charles H. Scholl, both of Vermilion; Joseph S. Smith, Euclid, and Edward A. Williams, Elyria, all of Ohio, assignors to Nordson Corporation, Amherst, Ohio**

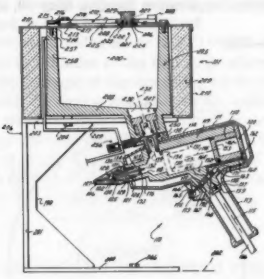
**Division of Ser. No. 762,530, Jan. 26, 1977, Pat. No. 4,144,913.**
**This application Nov. 6, 1978, Ser. No. 957,705**
**Int. Cl.[2] B65B *1/04;* B67D *5/62;* B67C *3/00***
**U.S. Cl. 141—2** **13 Claims**

1. A method of charging a hand held hot melt thermoplastic adhesive dispensing gun of the type adapted to discharge a molten fluid adhesive, that method comprising the steps of

providing a storage chamber within said gun,

providing a source of molten fluid adhesive at a location separate from said gun,

periodically connecting a feed valve mounted to said source with a charge valve mounted to said gun,



pressurizing said fluid adhesive within said source to force a charging flow of adhesive from said source through said valves into said gun's storage chamber, and

said pressurizing of said fluid adhesive within said source being effected automatically upon connection of said source's feed valve with said gun's charge valve.

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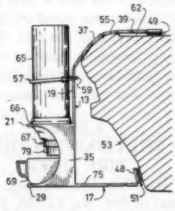
**4,303,109**

**BEVERAGE DISPENSER HOLDER WHICH IS READILY MOUNTABLE ON A VEHICLE DASHBOARD**

**Donald P. Cohen, Charleston, W. Va., assignor to Travel-Drink, Inc., Charleston, W. Va.**

**Filed Feb. 26, 1980, Ser. No. 124,865**
**Int. Cl.³ B65B *3/04***
**U.S. Cl. 141—98** **20 Claims**



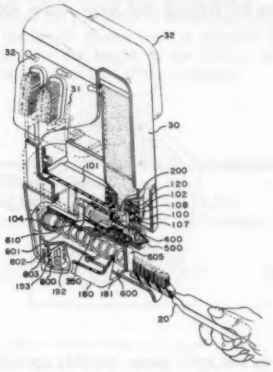
16. A combination of a beverage dispenser, a cup and a combined holder for the beverage dispenser and support for the cup which comprises a beverage dispenser, a cup, and a combined holder for the dispenser and support for the cup, which combined holder and support is adapted for installation of any of a pluraiity of different types of vehicle dashboards having upper surfaces of different shapes and having lower surfaces of different shapes, and which comprises means for holding such beverage dispenser in a dispensing position when the combined holder and support is installed on such dashboard, means for supporting such cup in alignment with such beverage dispenser, so that beverage dispensed from the dispenser will be dispensed into such supported cup, flexible means for conforming to any of a plurality of different upper surfaces of any of such vehicle dashboards and supporting said dispenser holding means and cup support by fastening of an upper portion of said holding means to such upper dashboard surface, and means for conforming to any of a plurality of different lower surfaces of any of such vehicle dashboards, for holding said combined holder and support to said lower dashboard surface by fastening of a lower portion thereof to such lower surface.

**4,303,110**

**TOOTHPASTE DISPENSER**

**Jason K. S. Chen, No. 17, La. 541, Sung Shen Rd., Taipei, Taiwan**

**Filed Dec. 5, 1979, Ser. No. 100,275**
**Int. Cl.³ B65B *3/04***
**U.S. Cl. 141—362** **4 Claims**



1. A toothpaste dispenser comprising:

a mounting base having an upper recess for mounting a toothpaste container;

a horizontal hole formed in the upper portion of said mounting base;

an adaptor capable of sealing the toothpaste container to said mounting base;

a passage formed in between said recess and said horizontal hole;

a one-way valve disposed in said passage, said valve preventing toothpaste drawn into the passage from returning to said toothpaste container;

a cylinder having a front end, a rear end, and a discharge chamber formed in the front end, said cylinder being fixedly inserted in said mounting base and having an opening near the front end and upper surface thereof, said opening being aligned with said horizontal hole;

an outlet valve disposed in said discharge chamber;

a discharge nozzle mounted coaxially at the front end of the cylinder;

a piston slidably inserted in said cylinder and capable of creating a vacuum in the cylinder when said piston is moved towards the rear end of said cylinder and a positive pressure when moved towards the front end of the cylinder; and

an actuator connected to said piston, a spring means being provided to urge said actuator towards the front end of said cylinder.

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**4,303,111**

**LOG FORMING MACHINE**

**Richard Neville, West Fork Rte., Darby, Mont. 59829**

**Filed Nov. 2, 1979, Ser. No. 90,564**
**Int. Cl.³ B27C *5/08***
**U.S. Cl. 144—2 R** **11 Claims**

1. A log shaping apparatus for natural logs having a center longitudinal axis, comprising:

a rigid supporting framework;

a cutting head having peripheral knife edges centered about a first axis, adapted to form a cylindrical surface configuration about a log engaged thereby;

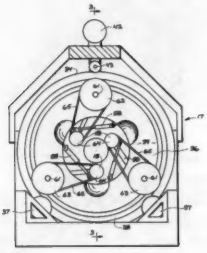
spool means rotatably mounted about a stationary longitudinal second axis on said framework;

mounting means supporting said cutting head on said spool

means for rotation of said cutting head relative to the spool means about said first axis;

adjustment means operably connected between the spool means and said mounting means for placing said first axis at a fixed selected distance from said second axis to cut the log at a desired constant diameter;

means on said framework operably connected to said spool means for rotating said spool means about said second axis;



means on said spool means operably connected to said cutting head for rotating said cutting head relative to said spool means about said first axis in response to rotation of said spool means about said second axis;

and

guide means extending longitudinally on said framework on opposite sides of said spool means for moving individual logs along a longitudinal path past the rotating cutting head with the center axis of the log maintained coaxial to said second axis.

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**4,303,112**

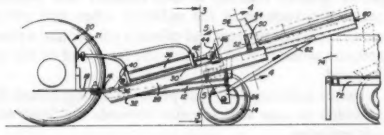
**LOG SPLITTER AND SPLIT WOOD LOADER**

**Leonard S. Sconce, RR #1, Grafton, Ill. 62037**

**Filed Jan. 21, 1980, Ser. No. 115,561**

**Int. Cl.³ B27L *7/00***

**U.S. Cl. 144—193 A** **10 Claims**



1. In combination, a wheeled trailer frame, said frame including front and rear ends and a forwardly projecting tongue for releasable coupling to a draft vehicle, an elongated guide structure supported from and extending longitudinally of said frame, an upstanding forwardly facing splitting wedge support from the rear portion of said guide structure, a pressure member supported on said guide structure forward of said wedge for guided movement along said guide structure toward and away from said wedge, power means operatively connected between said frame and pressure member for moving the latter said guide structure toward said wedge, said guide structure having elongated trough structure supported relative thereto defining trough means extending therealong with a portion of said guide structure defining the bottom of said trough structure, said trough structure extending both to the front and rear of said wedge.

**4,303,113**

**CUTTING TOOL**

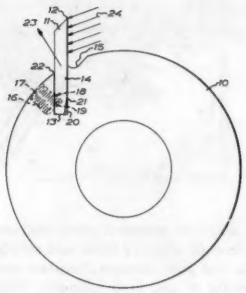
**Bengt A. Andersson, Halmstad, Sweden, assignor to Maskinfabriken Waco AB, Halmstad, Sweden**

**Filed Apr. 14, 1980, Ser. No. 140,001**

**Claims priority, application Sweden, May 10, 1979, 7904092**

**Int. Cl.³ B26D *1/12***

**U.S. Cl. 144—230** **6 Claims**



1. A tool comprising:

a tool body, said tool body having slots therein, said slots are provided with a bottom and are disposed in the periphery of said tool body; said slots having front and rear defining surfaces;

cutter bits detachably secured in said slots in the periphery of said tool body; said bits being provided with a chipping face and a rear face; and

clamping means for fixedly clamping said bits in said slots, each bit being provided with a clamping means which is adapted, on actuation, to urge said bit against the said defining surfaces of the slot at one point on the chipping face of said bit and at one point on the rear face of said bit and against the bottom of the slot, the point on said chipping face being located closer to the centre of the tool body than the point on said rear face.

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**4,303,114**

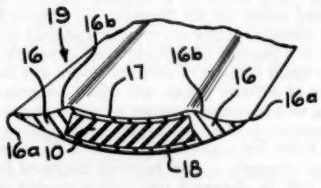
**METHOD FOR THE CONSTRUCTION OF IMPROVED TIRE LINERS**

**Donald R. Price, 210 Elvin Ct., Lansing, Mich. 48912**

**Continuation-in-part of Ser. No. 51,720, Jun. 25, 1979, Pat. No. 4,262,719. This application Dec. 18, 1980, Ser. No. 217,910**

**Int. Cl.³ B60C *5/18***

**U.S. Cl. 152—192** **15 Claims**



13. The improvement in a tire liner adapted to fit around and in contact with the inside U-shaped surface of a casing which is part of a pneumatic tire wherein the tire has spaced apart annular sidewalls supporting a tread and circular beads around the tire on each sidewall for mounting on a rim, wherein the tire liner includes an annular strip of a tread supporting material defining an annular length which conforms to the shape of the U-shaped surface of the tire casing opposite the tread and

where the width of the annular strip is defined by two opposite long sides which are between two opposite short sides defining a thickness along the length which comprises:

(a) a first annular strip of a tread supporting material which allows low temperature and pressure vulcanizable rubber to flow and to bond to the first strip;

(b) low temperature and pressure (LPT) vulcanizable rubber vulcanized to the sides of the first strip wherein the liner assumes the U-shape of the tire casing on the side to be in contact with the casing and wherein the vulcanized LPT rubber at the short sides of the first strip are each tapered to an edge and wherein there are two parallel grooves adjacent to each tapered edge in the LPT vulcanized rubber on the side of the liner opposite to the side opposite the side to be in contact with the tire casing.

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**4,303,115**

## PROCESS AND MOLD FOR SHAPING TIRE TREAD WITH BLADES TO PREVENT UNDULATIONS IN CROWN REINFORCEMENT AND PRODUCT

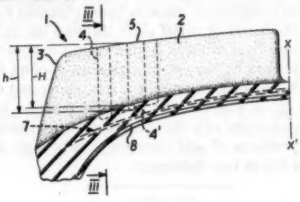
**Charles Flechtner, Clermont-Ferrand; Yves Herbelleau, Riom, and Jean Pommier, Clermont-Ferrand, all of France, assignors to Compagnie Generale des Etablissements Michelin, Clermont-Ferrand, France**

**Filed Jul. 28, 1980, Ser. No. 172,953**

**Claims priority, application France, Jul. 30, 1979, 79 19759**

**Int. Cl.³ B60C *11/12;* B29H *17/02***

**U.S. Cl. 152—209 R** **3 Claims**




1. A method of manufacturing an off-the-road tire having a radial carcass reinforcement, a crown reinforcement formed of at least two plies with free edges of wires or cables crossed from one ply to the next and a tread comprising oblong elements in relief or blocks arranged in the lateral zones of the tread and inclined in the direction of their length with respect to the circumferential direction of the tire, characterized by molding and vulcanizing the tire in a vulcanization mold having oblong recessed parts to mold the oblong elements in relief or blocks of the tread of the tire, the oblong recessed part of the vulcanization mold being provided with elements in relief or blades for forming corresponding furrows in the oblong elements in relief or blocks of the tread of the tire, the radially outer or free end of said elements in relief or blades,

(a) being located at a radial distance from the travel surface of the oblong block which is equal to between ½ and 6/5 of the radial height of the oblong block,

(b) having an effective width which is equal to between 1/10 and ½ of the width of the oblong block, and

(c) extending below the perimeter of the oblong block in the direction of the length thereof over an effective length at most equal to ½ of the length of the oblong block and below the axially outer half of the perimeter,

whereby foldings or undulations of the free edges of the plies of the crown reinforcement during molding and vulcanizing of the tire and prevented.

2. A vulcanization mold for use in the method according to claim 1 having oblong recessed parts to mold the oblong elements in relief or blocks of the tread of the tire, the oblong recessed parts of the vulcanization mold being provided with elements in relief or blades for forming corresponding furrows in the oblong elements in relief or blocks of the tread of the tire, the radially outer or free end of said elements in relief or blades,

(a) being located at a radial distance from the travel surface of the oblong block which is equal to between ½ and 6/5 of the radial height of the oblong block,

(b) having an effective width which is equal to between 1/10 and ½ of the width of the oblong block, and

(c) extending below the perimeter of the oblong block in the direction of the length thereof over an effective length at most equal to ½ of the length of the oblong block and below the axially outer half of the perimeter.

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**4,303,116**

## TIRE CHAIN

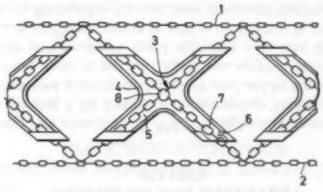
**Dietmar H. Holzwarth, Vogelhofstrasse 51, Schwäbisch Gmünd, Fed. Rep. of Germany (7070)**

**Filed Oct. 15, 1979, Ser. No. 84,584**

**Claims priority, application Fed. Rep. of Germany, Oct. 26, 1978, 2846907**

**Int. Cl.³ B60C *27/00***

**U.S. Cl. 152—224** **12 Claims**




1. A tyre chain, more particularly a skid protection chain, comprising a running network with steel links which is held by lateral retaining strands of which at least one is adapted to be tensioned, and comprising non-metallic supporting members which are disposed between chain strand portions of the running network and the tread of the tyre and which have supporting surfaces, provided with guide hollows, for the running network parts supported on the supporting members, characterized in that:

at the ends of the guide hollows (**5,13,16,18**) the supporting members (**4,9,10,12,15,17**) are provided with apertures (**6**) forming passages for running network portions,

means for adjusting the tension of said at least one lateral retaining strand (**1,2**) for varying the extent to which the steel links of the supported running network parts project out of the guide hollows in said supporting members,

at least parts of said guide hollows being orientated in a slanting direction relative to said lateral retaining strands due to the ground plan of said supporting members for preventing tilting movements of said supporting members.

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**4,303,117**

## VERTICALLY COLLAPSING CLOSURE SYSTEM

**Charles Lindbergh, 10 S. Basilica, Charleston, S.C. 29406**

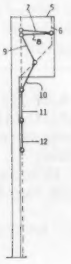
**Filed Oct. 31, 1979, Ser. No. 89,944**

**Int. Cl.³ E05D *15/26;* E05F *1/04, 11/06***

**U.S. Cl. 160—189** **16 Claims**

1. A vertically collapsing closure system for garages and the like comprising a door including a plurality of substantially rectangular panels in side-by-side articulated relationship, and means for operating said door to a full open position by causing said panels to rise until at the height of the door opening and then to fold in succession into stacked relationship substantially above the door opening, said means operating in a reverse mode for returning said panels to full closing relationship with the door opening by successively unfolding the panels to vertical positions at the top of said door opening and causing them to descend to a full closing position relative to the door open-

ing, said means includes panel mounted roller assemblies and a vertical rail section on opposite sides of the door opening, and a door counterweight means including a vertically movable counterweight, said counterweight comprising plural partial counterweights resting on drag means connected to said door, and each partial counterweight being associated with a stop means for retaining the partial counterweight in its descent at



a predetermined elevation and thereby separating it from the drag means, at least several partial counterweights are further sub-divided into two movable parts mounted one above the other and displaceable vertically relative to each other, and a support for the upper part of each sub-divided partial counterweight and being displaceable vertically by a limited amount when the counterweight means is in its lowest position.

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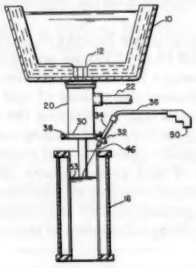
**4,303,118**

## APPARATUS FOR PRODUCING ALUMINUM-DEOXIDIZED CONTINUOUSLY CAST STEEL

**Michael D. Coward, Murrells Inlet, S.C., assignor to Georgetown Steel Corporation, Georgetown, S.C.**

**Filed Jul. 25, 1979, Ser. No. 60,270**
**Int. Cl.³ B22D *11/04, 11/10***
**U.S. Cl. 164—415** **1 Claim**



1. In the continuous casting of steel from a bottom-pour vessel into a vertically oscillatible continuous casting mold through a removable shroud, said vessel having a pouring nozzle in its bottom wall, said shroud being movable into an active position around said nozzle and in sealable relation with said vessel, and into a stand-by position remote from said nozzle, the improvement comprising apparatus detachably connected to said shroud for feeding wire to said mold during the shrouding of the pouring stream, said apparatus comprising:

(a) fastening means carried by and at the lower edge of said shroud for holding a wire directing tube, said fastening means consisting essentially of:

(i) an adjustable tube clamp for adjusting the direction and the angle of inclination of said tube,

(ii) a support ring removably connected to said shroud and carrying a protrusion adapted for engagement with said tube clamp, and

(iii) means for holding said tube clamp in a desired orientation;

(b) a wire detecting tube positioned in said fastening means;

(c) a flexible conduit attached to the end of said tube remote from said mold; and

(d) a wire feeding mechanism communicating with said flexible conduit for feeding wire through said conduit into said mold.

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**4,303,119**

## PROCESS FOR COOLING A METAL WIRE OBTAINED FROM A LIQUID JET

**Guy Jarrige, Cournon d'Auvergne, and Andre Reiniche, Clermont-Ferrand, both of France, assignors to Compagnie Generale des Etablissements Michelin, Clermont-Ferrand, France**

**Filed Jun. 27, 1980, Ser. No. 163,493**
**Claims priority, application France, Jul. 2, 1979, 79 17310**
**Int. Cl.³ B22D *11/00***
**U.S. Cl. 164—462** **8 Claims**

1. A process for cooling a wire of metal or metal alloy produced in an installation comprising essentially a crucible containing the molten metal or metal alloy, a die arranged in a wall of the crucible, an enclosure containing a pressurizing fluid acting on the metal or metal alloy in the crucible and a cooling enclosure following the die and containing a gaseous cooling fluid mixture having a base of gaseous hydrogen and at least one other component, the wire being obtained by projecting a jet of the metal or metal alloy through the die into the gaseous cooling fluid mixture contained in the cooling enclosure, characterized by the use of a gaseous cooling fluid mixture in which said other component is a compound of hydrogen capable of an endothermic chemical reaction in contact with the jet (wire) and of a chemical composition such that the product or products of said reaction have a high molecular content (mol %) of free hydrogen.

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**4,303,120**

## CONTINUOUS CASTING MOLD FLUX POWDERS

**George F. Carini, Penn Hills, Pa., assignor to The Clay Harden Company, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 874,024, Feb. 1, 1978, Pat. No. 4,190,444. This application Feb. 25, 1980, Ser. No. 124,343**
**The portion of the term of this patent subsequent to Feb. 26, 1997, has been disclaimed.**
**Int. Cl.³ B22D *11/00*; C22B *9/10***
**U.S. Cl. 164—472** **7 Claims**

1. In the continuous casting of steel wherein the steel is teemed from a tundish to a continuous casting mold, the improvement comprising introducing to said mold during teeming, a mold flux powder, consisting essentially of, in weight percent, at least three sequentially melting systems,

the first system comprising 10 to 30 percent of one or more glasses having softening point temperature between 1200° and 2000° F.,

the second system comprising 10 to 30 percent cryolite, fluorspar, sodium fluoride and mixtures thereof,

the third system comprising 40 to 80 percent of a mixture of Portland Cement and whiting, the weight ratio of whiting to Portland Cement in the mold flux powder being up to about 0.5,

whereby the fusion point, rate of fusion and fluidity can be tailored to a particular continuous casting process involved.

7. A composition of matter useful as a flux consisting essentially of, by weight

40 to 80 percent of a mixture of whiting and Portland Cement in a weight ratio up to about 0.5,

10 to 30 percent of fluorspar, cryolite and sodium fluoride and mixtures thereof,

10 to 30 percent by weight of one or more glasses,

said glasses analyzing, by weight percent $Na_2O$— 8 to 25; $K_2O$— up to 8; $B_2O_3$— 0 to 25; $SiO_2$— 20 to 75; $F_2$— 0 to 8; CaO— 10 to 30; BaO— 0 to 15; and $Al_2O_3$— 0 to 3.

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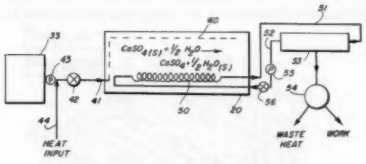
**4,303,121**

## ENERGY STORAGE BY SALT HYDRATION

**Jon B. Pangborn, Lisle, Ill., assignor to Institute of Gas Technology, Chicago, Ill.**

**Filed Apr. 24, 1978, Ser. No. 899,377**
**Int. Cl.³ F28F *00/00*; F28D *13/00*; F24H *7/00*; F24J *1/00***
**U.S. Cl. 165—1** **8 Claims**




1. A process for energy storage and release comprising the steps of: collecting thermal energy in a first heat transfer fluid; passing said first heat transfer fluid at a temperature of about 325° to about 400° F. in thermal exchange relation with calcium sulfate hemihydrate causing chemical reaction releasing water endothermically dehydrating said calcium sulfate hemihydrate to calcium sulfate anhydrite thereby storing energy; removing said released water from contact with the calcium sulfate anhydrite; passing water in contact with said calcium sulfate anhydrite under conditions to exothermically hydrate said calcium sulfate anhydrite to calcium sulfate hemihydrate releasing stored energy; and passing a second heat transfer fluid in thermal exchange relation with said dehydrated salt collecting released thermal energy at a temperature of about 225° to about 325° F. for desired use.

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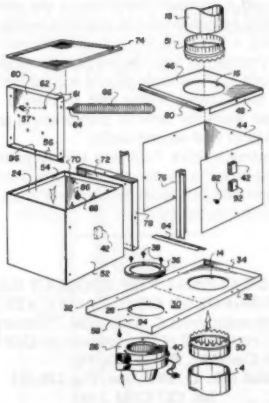
**4,303,122**

## FLUE HEAT RECOVERY DEVICE

**Ernest R. Powell, Piermont, N.Y., assignor to ENTEC Products Corporation, Fort Collins, Colo.**

**Filed Aug. 16, 1979, Ser. No. 67,021**
**Int. Cl.³ F28D *15/00***
**U.S. Cl. 165—39** **15 Claims**



1. In a flue heat recovery device for furnaces including a flue gas chamber, a clean air chamber, and heat pipes for transferring heat from said flue gas chamber to said clean air chamber, the improvement comprising, in combination, a rectangular base tray having upturned edges on the long sides and one short end thereof, a three-sided member sealably secured at its bottom edges to said upturned edges at said one end of said base tray, a top plate secured to the top edges of said three-sided member, a corrosion-proof wall releasably and sealably engaged with the open side of said three-sided member and top plate and forming therewith a flue gas chamber, means defining a flue gas inlet opening in said base tray opening into said flue gas chamber for connection to a furnace, means defining a flue gas outlet opening in said top plate opening for connection to a chimney flue, a four walled, open-ended box member removably supported on the other end of said base tray between the upturned long side edges thereon with one of the walls thereof supporting said corrosion-proof wall, said four-walled box member defining a clean air chamber having a clean air inlet opening, means defining a clean air outlet opening in said base tray opening from said clean air chamber, a fan for flowing air through said clean air chamber, a plurality of parallel heat pipes supported by and extending through said corrosion-proof wall, said pipes being inclined at an angle of at least about 10° to the horizontal with the lower ends thereof in said flue gas chamber and the upper ends thereof in said clean air chamber, said clean air chamber and the heat pipes carried thereby being removable as a unit from said base tray.

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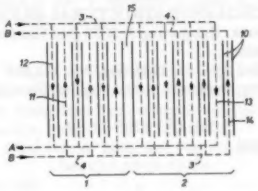
**4,303,123**

## PLATE HEAT EXCHANGER

**Malte Skoog, Lund, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden**

**Filed Jul. 9, 1979, Ser. No. 55,698**
**Claims priority, application Sweden, Jul. 10, 1978, 7807675**
**Int. Cl.³ F28F *3/08***
**U.S. Cl. 165—166** **1 Claim**



1. A heat exchanger having at least two sections of heat exchanging plates, each section comprising a plurality of said plates arranged adjacent to each other and forming between them sealed passages adapted to receive two heat exchanging fluids flowing therethrough, said passages for the respective fluids in at least one of said sections having essentially different flow resistances, the proportion of the flow resistances of the passages for the respective fluids in one section differing essentially from the corresponding proportion of another section, means connecting the passages for one of said two fluids in a first said section in parallel with the passages for one of said two fluids in a second said section, and means connecting the passages for the other of said two fluids in said first section in parallel with the passages for the other of said two fluids in said second section, whereby the heat exchanger is adapted for parallel flows of the same two fluids through said first and second sections, said passages for the respective fluids in each of two said sections having essentially different flow resistances, the proportion of the flow resistances of the passages for the respective fluids in one section being equal to the inverted value of the corresponding proportion in another section.

**4,303,124**

## PLATE HEAT EXCHANGER

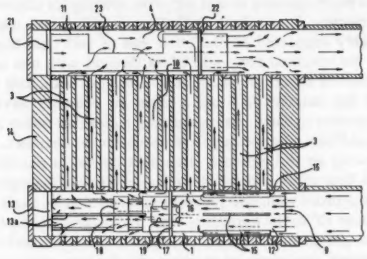
**Manouchahr F. Hessari, Brighton, England, assignor to The A.P.V. Company Limited, Crawley, England**

**Filed Jun. 3, 1980, Ser. No. 156,097**

**Claims priority, application United Kingdom, Jun. 4, 1979, 19339/79; Jul. 3, 1979, 23178/79**

**Int. Cl.³ F28F** *3/00, 9/22*

**U.S. Cl. 165—167** **14 Claims**



1. In a plate heat exchanger comprising a pack of plates arranged in spaced face-to-face relationship to define flow spaces between adjacent plates, the plates having aligned holes therein which form ducts for the supply and discharge of media to and from the flow spaces, the arrangement of the ducts for at least one medium being of symmetric or U arrangement with the supply and discharge ducts being fed from and discharged to the same end of the pack: the improvement that an insert is provided in the supply duct for the said at least one medium to assist in distribution of the medium along the pack of plates by increasing the flow to the flow spaces near the end of the pack remote from the inlet end of the supply duct.

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**4,303,125**

## HEAT EXCHANGE STRUCTURAL ELEMENT

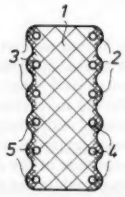
**Karl H. Vahlbrauk, Kriegerweg 1, 3353 Bad Gandersheim, Fed. Rep. of Germany**

**Filed Apr. 18, 1980, Ser. No. 141,565**

**Claims priority, application Fed. Rep. of Germany, Apr. 26, 1979, 2916799**

**Int. Cl.³ F28F** *13/14*

**U.S. Cl. 165—168** **21 Claims**




1. A structural heat-exchanger element, comprising a structural part including a body portion of a ceramic foam material and outer wall portions spaced from one another in a first direction so as to laterally outwardly bound said body portion, at least one of said outer wall portions being constituted of a material having a higher thermal conductivity than the material of said body portion; and conduit means for passing a heat-carrying medium through said structural part, said conduit means being formed by a plurality of passages extending in said structural part in a second direction transverse to said first direction, each of said passages having at least an outer wall which is formed by said one outer wall portion constituted of the material having the higher thermal conductivity, said one outer wall portion being constituted of the same cermaric foam material of which said body portion is constituted but with the higher thermal conductivity, and being of one piece with said body portion.

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**4,303,126**

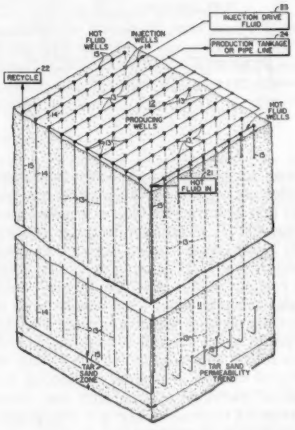
## ARRANGEMENT OF WELLS FOR PRODUCING SUBSURFACE VISCOUS PETROLEUM

**Theodore R. Blevins, Los Alamitos, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Filed Feb. 27, 1980, Ser. No. 125,069**

**Int. Cl.³ E21B** *43/24, 43/30*

**U.S. Cl. 166—245** **11 Claims**




1. A field method of recovering viscous petroleum from a subsurface petroleum-containing formation comprising:

(a) establishing a grid pattern of locations at the earth's surface above said formation and drilling a set of first wells into said subsurface formation from substantially equally spaced locations in accordance with said grid pattern;

(b) drilling a plurality of second wells at least a portion of each of said wells passing substantially horizontally through said subsurface formation in the vicinity of and substantially perpendicular to said first wells;

(c) circulating a hot fluid through said second wells to reduce the viscosity of said viscous petroleum in said formation adjacent to the outside of said second wells to form a potential passageway within said formation adjacent to said second wells for flow of petroleum in said passageway outside of said second wells;

(d) and injecting a drive fluid into said formation through said passageway to promote flow of petroleum in said formation to said first wells for recovery from said formation.

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**4,303,127**

## MULTISTAGE CLEAN-UP OF PRODUCT GAS FROM UNDERGROUND COAL GASIFICATION

**John Freel, Oakmont; John C. Montagna, Pittsburgh, and Seh M. Ryu, Murrysville, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Feb. 11, 1980, Ser. No. 120,153**

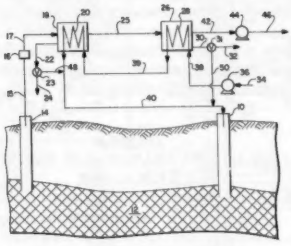
**Int. Cl.³ C10J** *5/00*

**U.S. Cl. 166—266** **20 Claims**

1. A multistage process for the separation of contaminants from a hot product gas resulting from in-situ gasification of underground coal deposits in an underground coal gasification zone which comprises:

(a) passing said hot product gas through a first heat exchange zone in indirect, countercurrent heat exchange relationship with a first portion of gasification gas to reduce the temperature of said product gas to a temperature in the range of between about 200° F. and 450° F. and increase the temperature of said first portion of gasification gas so as to cause coal-derived tar present in said product gas to separate therefrom and provide a substantially tar-free product gas;

(b) withdrawing said substantially tar-free product gas from said first heat exchange zone and passing said substantially tar-free product gas through a second heat exchange zone in indirect heat exchange relationship with a second portion of said gasification gas so as to reduce the temperature



of said substantially tar-free product gas to a temperature in the range of between 50° F. and 150° F. and increase the temperature of said second portion of said gasification gas and cause substantially all of said water present in said gas to condense and separate therefrom;

(c) withdrawing a substantially tar-free and water-free product gas from said second heat exchange zone; and

(d) withdrawing said second portion of gasification gas of increased temperature from said second heat exchange zone and passing it to said first heat exchange zone thereby providing said first portion of gasification gas; and withdrawing said first portion of gasification gas of increased temperature from said first heat exchange zone and passing it to an underground coal gasification zone.

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**4,303,128**

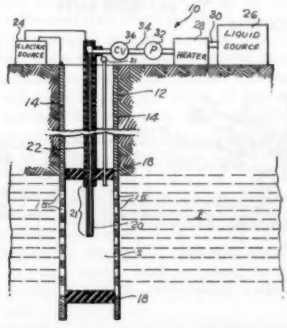
**INJECTION WELL WITH HIGH-PRESSURE, HIGH-TEMPERATURE IN SITU DOWN-HOLE STEAM FORMATION**

**Andrew W. Marr, Jr., P.O. Box 1464, Ardmore, Okla. 73401**

**Filed Dec. 4, 1979, Ser. No. 100,704**

**Int. Cl.³ E21B *43/24***

**U.S. Cl. 166—302** **37 Claims**




1. An injection well comprising a bore hole, a casing, sealing means, electrode means, means for conducting liquid, liquid pressure means and electric power supply,

the bore hole having a perimeter and extending from ground surface level into or through an oil-bearing earth formation,

the casing being an electrically-conductive hollow casing extending along the perimeter of the bore hole from ground surface level to a level at or below the oil-bearing earth formation and having multiple perforations throughout a portion thereof adjacent the oil-bearing earth formation,

the sealing means being two spaced-apart high-pressure-resistant plugs sealing the casing, the first such plug being at an elevation above and the second plug being at an elevation below at least a portion of the oil-bearing earth formation,

the electrode means comprising means to conduct electrical current into the bore hole from ground surface level through the first plug to a lower extremity in the space between the two plugs, said electrode means being externally electrically insulated from the ground surface level to and including the level of the first plug, but to a level which is significantly higher than the lower extremity,

the means for conducting liquid comprising means to supply a liquid at a pressure of at least 400 psi to the space between the two plugs, and

the electric-power supply comprising means to produce a current of at least 800 amps between a non-insulated portion of the electrode means in the space between the two plugs and adjacent casing.

30. A process for extracting oil from an underground oil-bearing earth formation which comprises:

continuously charging liquid through tubing and under a pressure within a range of from 400 to 25,000 psi into a well to a level within the oil-bearing earth formation, and

passing sufficient electrical current through said tubing, through liquid at the level within the oil-bearing earth formation and through casing for the well to heat said tubing by induction and to heat the liquid to a temperature in the range of 500° F. to 1000° F. (260° C. to 537° C.) at said level under prevailing pressure.

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**4,303,129**

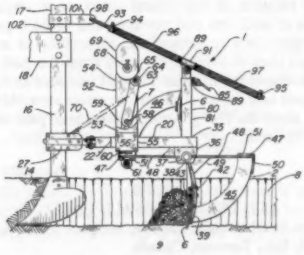
**FURROW DAMMING IMPLEMENT**

**Franky Mills, Plainview, Tex., assignor to The Hamby Company, Plainview, Tex.**

**Filed Feb. 4, 1980, Ser. No. 118,406**

**Int. Cl.³ A01B *13/16***

**U.S. Cl. 172—530** **4 Claims**



4. An agricultural furrow damming implement for attachment to a tool bar and comprising:

(a) a circular wheel structure having a center axis and aligned for rolling over a ground surface in a line of draft, said wheel structure having spaced, oppositely positioned, earth scraping discs of dish shape extending radially from said center axis and having respective outer edges substantially at a circumference of said wheel structure;

(b) spaced, opposite arms respectively extending arcuately in trailing relation to each of said discs and extending entirely from respective said outer edges along the circumference of said wheel structure for approximately 90° arc segments thereof; said arms terminating in respective end portions;

(c) spaced, opposite spoke members extending radially from said center axis and respectively terminating in juncture with said arms at said end portions;

(d) a shock absorbant pad mounted on each of said end portions;

(e) a yoke having a front portion with spaced side members and a forwardly extending hitch means for connection to a tool bar and including means providing upward and downward movement for travel over a ground surface; said wheel structure being rotatably mounted between said side members for rotation in a vertical plane;

(f) a latch means secured to the front portion of said yoke and extending generally between said side members forwardly of said wheel structure for forward and rearward swinging movement, said latch means including spaced standards upstanding from said side members with an axle member extending therebetween, a lower, transversely extending catch arm rigidly connected to said axle member and generally located in horizontal alignment with said center axis and an upper, transversely extending cam follower arm and a return spring connected to said latch means; said latch means being swingable on said axle member to move said catch arm into and out of a path of rotation of said wheel structure and provide engagement and disengagement of said catch arm with one of said arm end portions; said catch arm engaging said pad with said pad cushioning the force of engagement for relatively low noise and wear;

(g) a biasing means extending forwardly from said yoke and having a forward end for attachment to a tool bar; said yoke having spaced rear standards upstanding therefrom and adjacent said wheel structure and having an upper cross arm positioned above said wheel structure and with a sleeve member pivotally mounted thereon; said biasing means including an elongate rod with front and rear ends extending through said sleeve member and with front and rear coil springs sleeved on said rod respectively between said sleeve member and said front and rear ends with said coil springs urging said sleeve member toward an intermediate position on said rod and biasing said wheel structure into earth engaging relation; and

(h) drive means operatively connected to said latch means and including a drive shaft rotatably mounted to said front standards for up and down movement therewith and a cam secured to said drive shaft and engaging said cam follower arm to urge said catch arm rearwardly into the path of rotation of said wheel structure to engage with said one of said arm end portions and cause a preceding one of said discs to scrape and accumulate a mound of earth and then to swing forwardly from the path of rotation and disengage from said one of said arm end portions and permit said wheel structure to rotate smoothly on one of said arms on the ground surface and pass over said mound of earth.

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**4,303,130**

## ALL TERRAIN DRILL UNIT

**Aaron Bonca, Scarborough, Canada, assignor to BOA Drilling Equipment, Inc., Toronto, Canada**

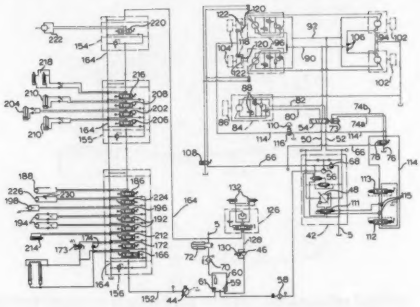
**Filed Sep. 13, 1979, Ser. No. 75,206**

**Claims priority, application United Kingdom, Mar. 31, 1977, 13561/77**

**Int. Cl.³ E21C *11/02***

**U.S. Cl. 173—23** **6 Claims**

1. In an all terrain drill unit comprising an all terrain vehicle chassis, propulsion means for said chassis, a drilling mast mounted on the chassis for movement between a horizontal position overlying the chassis and a vertical position overhanging the chassis, a drilling head carried by the drilling mast, and a power source on the chassis for the drilling head, the improvement wherein first hydraulically operated actuator means is provided linked to the drilling mast and chassis for moving the former to any location between its horizontal and vertical positions inclusive, second hydraulically operated actuator means is provided linked to the drilling mast and the drilling head for moving the latter longitudinally of the mast, third hydraulically operated actuator means is provided on the vehicle chassis to locate the latter in a desired drilling attitude, and a first hydraulic pump is fluid linked to said actuator means to supply pressurized hydraulic fluid thereto, wherein the power source for the drilling head is a second variable displacement hydraulic pump which is alternatively a power source for the propulsion means for the vehicle chassis and is controllable independently of said first hydraulic pump, wherein the actuator unit for said drilling head is a reversible drive motor and the propulsion means for said vehicle chassis are a plurality of wheels each associated with a reversible hydraulic drive motor, and wherein control valve means are provided through which the second hydraulic pump is selectively fluid linked to said motors for said drilling head and said vehicle chassis, said control valve means comprising a first control valve means adapted to reverse said motors and having a neutral position, and second control valve means directing fluid either to said drill head motor or to said wheel drive motors.



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**4,303,131**

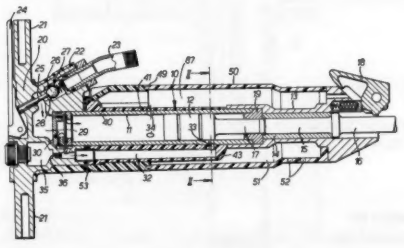
## COMPRESSED-GAS-OPERATED RECIPROCATING PISTON DEVICES

**Malcolm Clark, Helston, England, assignor to Compair Construction and Mining Ltd., Cornwall, England**

**Filed Feb. 27, 1980, Ser. No. 125,090**

**Int. Cl.³ B23B *45/16***

**U.S. Cl. 173—134** **17 Claims**



1. A compressed-gas-operated reciprocating piston device, which includes a composite cylinder component comprising a

rigid inner metal cylinder tube in which the piston reciprocates in use and an outer sleeve moulded of polymerized plastics material and surrounding and bonded to the metal cylinder tube, the sleeve being in contact with the entire outer circumferential surface of the major part of the length of the tube, and the sleeve being formed on its outer surface with a plurality of longitudinally-extending outwardly-projecting integrally-moulded ribs spaced apart around the circumference of the sleeve, the device further including an outer tubular muffler made of polymerized plastics material which surrounds the ribbed sleeve, there being formed within the interior of the muffler, first and second chambers which are in communication with one another via a restricted-flow throat, referred to as the restriction, the cylinder component being formed with at least one gas discharge port in its wall which opens into the first muffler chamber, and the second muffler chamber communicating with the muffler exhaust opening, whereby exhaust gas discharged from the cylinder interior through the gas discharge port passes in sequence via the first muffler, the restriction and the second muffler chamber before reaching the ambient atmosphere via the muffler exhaust opening.

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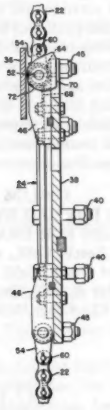
**4,303,132**

## SAFETY DEVICE FOR ROTARY EARTH DRILLING APPARATUS

**William J. Weber, Claremont, N.H., assignor to Joy Manufacturing Company, Pittsburgh, Pa.**

**Filed Feb. 4, 1980, Ser. No. 118,363**
**Int. Cl.³ B23Q *5/027, 5/033***
**U.S. Cl. 173—147** **8 Claims**



1. In a rotary and/or percussion drilling rig of the type having a vertically-extending tower provided with a guideway for a drill-carrying cradle, sprocket means at opposite ends of said tower, and chain means movable around said sprocket means and connected to said cradle whereby movement of the chain means will cause vertical movement of the cradle and a drill carried thereby; the improvement in said drilling rig of means for preventing said cradle and a drill carried thereby from dropping in the event of breakage of said chain means, said improvement comprising:

a connecting member secured to a shaft pivotally carried on said cradle and having leg means pivotally connected to an end of said chain means,

torsion spring means urging said shaft and said connecting member to rotate from a position where the connecting member is aligned with the chain means while it is under tension, and

at least one toothed dog secured to said shaft and rotatable with the shaft under the force of said torsion spring means to engage said tower and secure the cradle against movement until tension is again restored to the chain means.

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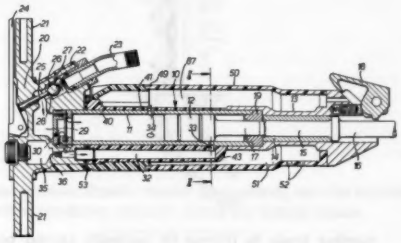
**4,303,133**

## COMPRESSED-GAS-OPERATED RECIPROCATING-PISTON DEVICES

**Reginald O. Godolphin, Camborne, England, assignor to Compair Construction & Mining Limited, Cornwall, England**

**Filed Feb. 27, 1980, Ser. No. 125,085**
**Claims priority, application United Kingdom, Feb. 28, 1979, 07037/79; Sep. 4, 1979, 30613/79**
**Int. Cl.³ B21J *3/00***
**U.S. Cl. 173—134** **15 Claims**



1. A compressed-gas-operated reciprocating piston device, which includes a composite cylinder component comprising a rigid inner metal cylinder tube in which the piston reciprocates in use and an outer sleeve moulded of polymerized plastics material and surrounding and bonded to the metal cylinder tube, the sleeve overlying the entire outer circumferential surface of the major part of the length of the tube, and the sleeve being formed on its outer surface with a plurality of longitudinally-extending outwardly-projecting integrally-moulded ribs spaced apart around the circumference of the sleeve, the device further including an outer tubular muffler made of polymerized plastics material which surrounds the ribbed sleeve and defines within the muffler a chamber referred to as the muffler chamber, which communicates with an exhaust opening leading out of the muffler into the ambient atmosphere, the cylinder component being formed with at least one gas discharge port in its wall which opens into the muffler chamber between two adjacent ribs of the sleeve, and in which a longitudinally-extending elongate moulded passage is formed in the interior of at least one of the ribs, and passage constituting a transfer passage for supplying compressed gas to one end portion of the interior of the cylinder tube.

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**4,303,134**

## EARTH BORING GUIDE

**Newton B. Dismukes, 2952 Buttonwood Dr., Carrollton, Tex. 75006**

**Continuation-in-part of Ser. No. 948,085, Oct. 2, 1978. This application Jul. 24, 1980, Ser. No. 171,801**
**Int. Cl.³ E21B *7/08***
**U.S. Cl. 175—61** **10 Claims**

1. Guide means for changing the direction of advance in a bore hole of a boring tool comprising a rotary bit affixed to a flexible conduit for conducting drilling fluid thereto comprising:

a. a frame,

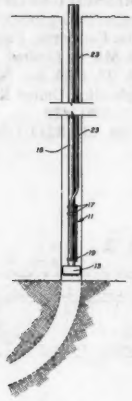
b. spaced upper and lower conduit holding members, said upper conduit holding members being attached to said frame;

c. at least one normally curved elongated resilient member connecting said upper and lower conduit holding members;

d. means carried by said frame for restraining said resilient

member in a straightened condition whereby said upper and lower holding members are axially aligned; and

e. means operable from the surface of said bore hole for releasing said restraining means whereby said resilient



member tends to resume its normally curved position displacing said lower conduit holding member relative to said upper conduit holding member whereby said conduit and rotary bit are deflected in the direction of such displacement.

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**4,303,135**

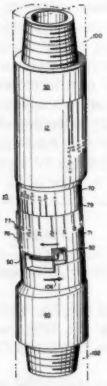
## DIRECTIONAL DRILLING SUB

**Lloyd F. Benoit, Rte. 1, Box 57B, Arnaudville, La. 70512**

**Continuation-in-part of Ser. No. 825,589, Aug. 18, 1977, Pat. No. 4,220,214. This application May 21, 1979, Ser. No. 40,966**

**Int. Cl.³ E21B** *7/08*

**U.S. Cl. 175—73** **11 Claims**



1. A directional tool for causing the direction of an operative device such as, for example, a drill bit to be offset and deviated down in the hole from the straight-angle of the drill string nearest it comprising:

a. an extended tool body;

b. first connection means on an upper end of said tool body for attaching said tool body to the drill string and having a central longitudinal axis hereafter referring to as the top longitudinal axis;

c. second connection means on the lower end of said tool body for attaching the operative device to said tool body and having a central longitudinal axis hereinafter referred to as the bottom longitudinal axis;

d. central connection means between said first and second connection means for connecting said first and second connection means together and allowing them to rotate relative to one another, the said relative rotation making an angle with both said top and said bottom longitudinal axes, said second connection means and said first connection means being rotatably movable through said central connection means from a first position, in which said top and bottom longitudinal axes are at least substantially parallel, allowing the tool to be moved through the hole with the drill string and the operative device in alignment at least part of the time, to a second position down in the hole in which said top and bottom longitudinal axes are deviated making an angle with one another, causing the direction of the operative device to be offset and deviated down in the hole from the straight angle of the new drill string nearest it of rotation being fixed as said first and said second connection means are rotatably moved between said first and said second positions, and

said central connection means has at least two, extended planar mating in face-to-face relationship surfaces lying at least in part in a plane perpendicular to said axis of rotation and laterally movable with respect to one another and disposed in at least some spaced portions about said axis of rotation, and said central connection means has associated with it a central cylindrical surface about its axis of rotation and wherein at least one of said first and second connection means has associated with it an interior cylindrical surface having a central longitudinal axis coincident with said axis of rotation and a diameter nearly equal to the diameter of said central cylindrical surface, said cylindrical surfaces being nested and mating with one another in face-to-face relationship for relative rotation, and said cylindrical surfaces and said planar mating surfaces guiding and positioning said first and said second connection means as they rotate with respect to one another between said first and said second positions.

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**4,303,136**

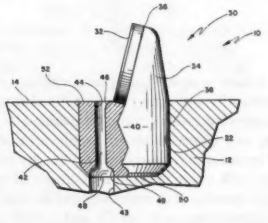
## FLUID PASSAGE FORMED BY DIAMOND INSERT STUDS FOR DRAG BITS

**Harry N. Ball, Long Beach, Calif., assignor to Smith International, Inc., Newport Beach, Calif.**

**Filed May 4, 1979, Ser. No. 36,215**

**Int. Cl.³ E21B** *10/56, 10/60*

**U.S. Cl. 175—329** **1 Claim**



1. A man-made synthetic diamond insert stud comprising:

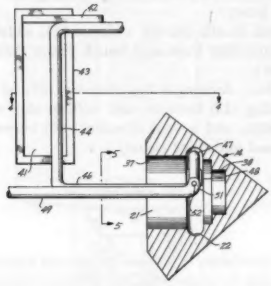
a substantially cylindrical stud body having a first extended diamond faced cutter end and a second base end,

a fluid passage having a first exit end and second entry end formed by said body of said stud, said fluid passage being substantially aligned with the axis of said body, said first exit end of said passage formed by said stud being substantially aligned and flared to diffuse fluid exiting said first exit end over and around said diamond face of said first extended diamond faced cutter end of said stud body.

## 4,303,137
## METHOD FOR MAKING A CONE FOR A ROCK BIT AND PRODUCT

John F. Fischer, Los Alamitos, Calif., assignor to Smith International, Inc., Newport Beach, Calif.

Filed Sep. 21, 1979, Ser. No. 77,860
Int. Cl.[3] C21D 9/22
U.S. Cl. 175—374 18 Claims



1. A process for forming a tungsten carbide insert cone for a rock bit comprising the steps of:

forming a cone blank from a medium to high carbon hardenable steel, the cone blank including a generally conical external surface, a generally cylindrical internal bearing race in the bearing cavity;

heat treating the cone blank to a desired core hardness;

forming insert holes in the external surface of the cone blank for insertion of tungsten carbide inserts;

applying energy substantially only to the surface of the ball race for a time interval and with an intensity sufficient to austenitize a layer at least about 0.01 inch thick adjacent the ball race surface; and

cooling the austenitized layer sufficiently rapidly to form martensite.

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## 4,303,138
## EARTH DRILLING LUBRICATED HYDRAULIC SHOCK ABSORBER AND METHOD

[illegible] Beasinger, Midland, Tex., assignor to Oncor Corporation, Houston, Tex.

Continuation-in-part of Ser. No. 860,568, Dec. 14, 1977, Pat. No. 4,171,025, which is a division of Ser. No. 729,194, Oct. 4, 1976, Pat. No. 4,067,405. This application Apr. 19, 1979, Ser. No. 31,524
Int. Cl.[3] E21B 21/00, 41/00
U.S. Cl. 175—296 6 Claims

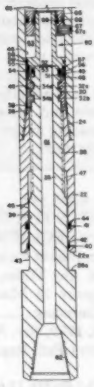
1. A shock absorber having a sealed lubricated reciprocating anvil for use with an earth boring drill string utilizing drilling fluid, comprising:

a casing defining an inner surface and for connecting with a drill string;

an anvil having a pressure responsive surface for transferring the force of the drilling fluid to the anvil and defining an outer surface reciprocally mounted within the casing inner surface and forming an annulus with the casing inner surface and having a lubricating fluid in the annulus;

said anvil having an inverted piston means having a pressure responsive surface smaller than the pressure responsive surface of the anvil and blocking any force of the drilling fluid from acting on the larger pressure responsive surface of the anvil to provide a lower drilling fluid pressure responsive shock absorber; and

said casing inner surface and said anvil outer surface having unidirectional upper and lower sealing means at opposed ends of the annulus to retain the lubricating fluid therein



and prevent abrasive matter from getting into the annulus while equalizing pressure across the sealing means.

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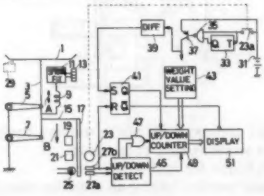
## 4,303,139
## ELECTRONIC WEIGHING APPARATUS

Masamichi Hino, Suita, and Hiroshi Nishikawa, Osaka, both of Japan, assignors to Kubota Ltd., Osaka, Japan

Filed Oct. 1, 1979, Ser. No. 80,399
Int. Cl.[3] G01G 3/14
U.S. Cl. 177—210 FP 23 Claims




1. An electronic weighing apparatus including electric circuit components comprising:

article placement means for placement of an article,

displacement means operatively coupled to said article placement means for causing a displacement in association with a weight of an article placed on said article placement means and having a plurality of detectable portions arranged at predetermined intervals,

article detecting means for detecting placement of an article being weighed on said article placement means and for generating an output, said article detecting means operatively responsive to a displacement of said displacement means,

pulse signal generating means operatively coupled to said displacement means and responsive to said plurality of detectable portions for generating pulse signals,

counter means responsive to the pulse signals from said pulse signal generating means for counting said pulse signals for generating data associated with the weight value of said article placed on said article placement means, and

display means for displaying in a digital manner said data associated with the weight value of said article generated in said counter means,

said plurality of detectable portions of said displacement means being formed to generate said pulse signals from said pulse signal generating means when a displacement of

said displacement means exceeds a displacement amount corresponding to a predetermined weight value,

predetermined weight value loading means for storing the data associated with said predetermined weight value and for preloading said data associated with said predetermined weight value into said counter means, and

means operatively responsive to the article detecting means output for disabling said predetermined weight value loading means at least until an output is obtained from said article detecting means and for enabling said predetermined weight value loading means when an article detecting means output is obtained.

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**4,303,140**

## TRANSPORT APPARATUS FOR HEAVY OPEN-CAST WORKING EQUIPMENT

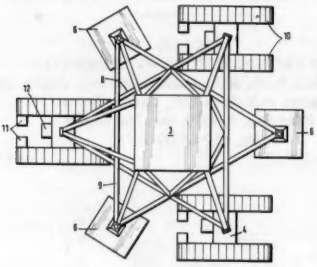
**Rudiger Franke, Mettmann; Rudolf Fauerbach, Hilden; Michael Wenzel, Düsseldorf, and Aby Weiss, Monheim, all of Fed. Rep. of Germany, assignors to Mannesmann DeMag AG, Duisburg, Fed. Rep. of Germany**

**Filed Oct. 16, 1979, Ser. No. 85,263**

**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1978, 2848996**

**Int. Cl.³ B62D *11/02***

**U.S. Cl. 180—6.2** **9 Claims**



1. A transport apparatus for use in moving equipment from working site to working site, comprising:

(a) a support frame for said equipment;

(b) a first frame portion having an isosceles triangle configuration;

(c) the corners of said first frame portion being provided with a plurality of selectively securable and removable transport means for moving said support frame and equipment;

(d) a second frame portion having an isosceles triangle configuration, said second frame portion being positioned 180°, in a horizontal plane, relative to said first frame portion; and

(e) said second frame portion being provided, at its corners, with ground engaging base members.

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**4,303,141**

## LIQUID SLUG PROJECTOR APPARATUS

**Adrien P. Pascouet, 6300 Hillcroft #610, Houston, Tex. 77081**

**Continuation-in-part of Ser. No. 7,122, Jan. 26, 1979, abandoned, which is a continuation-in-part of Ser. No. 884,441, Mar. 7, 1978, abandoned. This application Apr. 28, 1980, Ser. No. 144,686**

**Int. Cl.³ G01V *1/137, 1/138***

**U.S. Cl. 181—120** **10 Claims**

7. A liquid slug projector apparatus (**9**) comprising:

a generator (**10**) having a housing (**13**) including a first bore (**16**) a bottom stop wall (**17**) defining a main port (**17*b***), a second bore (**66*a***), and a top stop wall (**68**) defining a top port (**68'**);

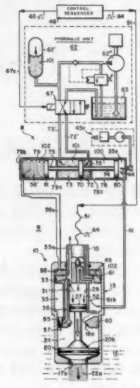
a first shuttle (**26**) having a first piston (**20**), a second piston (**27**), and a push rod (**26*a***) interconnecting said first and second pistons;

a second shuttle (**61*a***) having a third piston (**60**), a fourth piston (**61**), and an interconnecting push rod (**61*b***) defining a third bore (**29**) therein;

said first piston being slidably mounted in said first bore, said second piston being slidably mounted in said third bore, said third piston being slidably mounted in said first bore, and said fourth piston being slidably mounted in said second bore;

said second shuttle having a sleeve (**15**) slidably and sealingly extending from said fourth piston through said top port (**68'**);

said first bore defining a slug chamber (**23**) for containing a liquid slug (**22**) between said bottom stop wall and said first piston, and a vent chamber (**24**) between said first piston and said third piston;



said second bore defining: a return chamber (**58**) between said fourth piston and said top stop wall, a trigger chamber (**31**) between said second and fourth pistons, and a main reservoir chamber (**35**) between said first and second shuttles;

a pneumatic unit (**45*c***) including a normally-closed valve (**43**) for coupling a pressurized gas (**100**) to said main reservoir chamber;

a hydraulic fluid (**102**) in said main return chamber;

a first, normally-closed, electrically-operated valve (**50**) coupling said reservoir chamber to said trigger chamber, said valve (**50**) when open causing said pressurized gas to abruptly propel said first shuttle to execute a forward stroke which expels said liquid slug;

said hydraulic fluid (**102**) causing said second shuttle to move toward and lock to said first shuttle, thereby compressing said gas in said main reservoir chamber; and

said hydraulic fluid (**102**) and said gas (**100**) causing said locked shuttles to return to said rest position.

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**4,303,142**

## COMBINED ACOUSTICAL TRANSDUCER AND GRILLE

**Keith F. Urban, Elk Grove Village, Ill., assignor to International Jensen Incorporated, Schiller Park, Ill.**

**Filed Aug. 11, 1980, Ser. No. 176,919**

**Int. Cl.³ H05K *5/00***

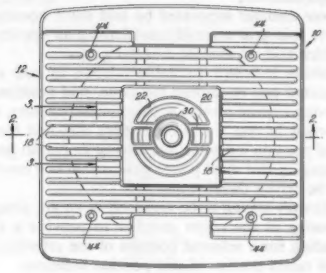
**U.S. Cl. 181—144** **6 Claims**

1. A combined acoustical transducer and grille comprising

a. an acoustically transparent, rigid grille having an exposed front side and a rear side for mounting of an acoustical transducer and including a plurality of wave guides separated for through-passage of sound,

b. a transducer mounting situated in the midst of said grille

and located within the confines of said wave guides, said transducer mounting including a central aperture and an annular groove formed about the periphery of said central aperture, said groove being open toward the rear side of said grille,



c. an acoustical transducer having a peripheral dimension approximately equal to the dimensions of said groove,

d. means attaching said acoustical transducer to said groove, and

e. a second wave guide spanning said central aperture to disperse sound emanating from said acoustical transducer.

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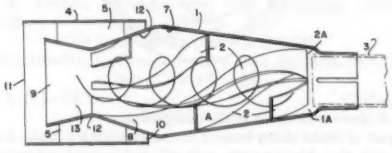
**4,303,143**

## EXHAUST GAS CONTROL SYSTEM

**Yoshifumi Taniguchi, Toyonaka, Japan, assignor to Mitsuko Leith, Honolulu, Hi.**

**Filed Jan. 28, 1980, Ser. No. 116,193**
**Int. Cl.³ F01N *1/12, 1/14***
**U.S. Cl. 181—263** **9 Claims**



1. An exhaust gas control system comprising an exhaust gas guiding pipe having a proximal end configured for attachment to a distal end of an exhaust pipe, the guiding pipe having a first divergent portion beginning with the proximal intake end and having a second convergent portion spaced from the intake end and having a plurality of longitudinally extending spiralling blades centrally converging adjacent said proximal end for spiralling exhaust gasses from the exhaust pipe.

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**4,303,144**

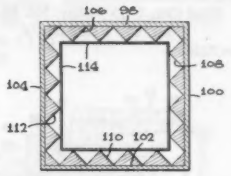
## APPARATUS FOR THE RETROREFLECTION OF SOUND

**Leslie S. Wirt, Newhall, Calif., assignor to Lockheed Corporation, Burbank, Calif.**

**Filed Dec. 21, 1979, Ser. No. 106,237**
**Int. Cl.³ E04F *17/04;* E04B *1/82;* G10K *11/20***
**U.S. Cl. 181—288** **12 Claims**

8. An acoustical treatment for a passageway or duct comprising

a plurality of acoustical retroreflectors each having the form of a substantially orthogonal pyramidal cavity and disposed in a contiguous surface array; and



means for mounting said array on at least one interior wall of said passageway or duct.

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**4,303,145**

## LADDER, PLATFORM & EXTENSION

**Roberto Vazquez, 4737 Cole St., West Palm Beach, Fla. 33409**

**Filed May 8, 1980, Ser. No. 147,849**
**Int. Cl.³ E06C *7/16, 7/14***
**U.S. Cl. 182—122** **1 Claim**

1. A dual purpose ladder attachment convertable from a human support platform position to a scaffold position simply by inverting the device, comprising:

a pair of L-shaped support members;

each said support member having a first strut member and a second strut member, said first strut member having one end pivotally connected to one end of said second strut member;

one end of each said first strut member connected to a respective first-type bracket;

one end of each said second strut member connected to a respective second-type bracket;

said first-type and second-type brackets being slidably engageable with a side rail of the ladder and having a portion thereof slotted and sized to partially encompass a preselected rung of the ladder to hold said first-type and said second-type brackets in place

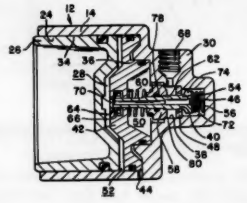
a platform; and

a platform support member having each end demountably attached to a respective support member such that said platform can be supported by said platform support member and a ladder rung.

## 4,303,146
## QUICK TAKE-UP DISC BRAKE ASSEMBLY

**Robert F. Gaiser, Stevensville, Mich., assignor to The Bendix Corporation, Southfield, Mich.**

**Filed Oct. 1, 1979, Ser. No. 80,879**
**Int. Cl.³ F16D *65/74***
**U.S. Cl. 188—71.8** **9 Claims**

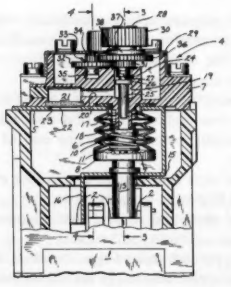


1. In a disc brake assembly having a caliper cooperating with a pair of friction elements to move the latter from a rest position to a braking position in engagement with the disc, the caliper defining a bore for movably receiving a piston, and the piston cooperating with the caliper to substantially define a chamber for receiving fluid pressure, characterized by said chamber including pressure responsive means imparting a first rate of movement to said piston as the fluid pressure increases to a predetermined value, and said pressure responsive means imparting a second rate of movement to said piston when the fluid pressure is above the predetermined value, said pressure responsive means including a valve assembly and a plate, said plate separating said chamber into a first cavity and a second cavity, and said valve assembly communicating the fluid pressure to said first cavity when the fluid pressure is below the predetermined value and communicating the fluid pressure to said second cavity when the fluid pressure is above the predetermined value, said valve assembly comprising a first valve normally closing the second cavity to the fluid pressure and a second valve normally opening communication of the fluid pressure to the first cavity.

## 4,303,147
## ADJUSTMENT FOR PNEUMATIC TIMER

**George J. Selas, Milwaukee, and John S. Hart, Racine, both of Wis., assignors to Allen-Bradley Company, Milwaukee, Wis.**

**Filed Apr. 12, 1978, Ser. No. 895,728**
**Int. Cl.³ F16F *9/04*; H01H *7/03***
**U.S. Cl. 188—298** **5 Claims**



1. In a position indicator for a pneumatic timing device, the combination comprising:

a rotatable adjustment member having a concentrically disposed drive gear at one end thereof;

a gear assembly having an axis laterally disposed from the axis of rotation of said adjustment member, with a large intermediate gear engaging said drive gear to be turned thereby and a small pinion gear attached in concentric arrangement to said intermediate gear for rotation therewith;

a valve with a valve housing and with a valve member that is coupled to said adjustment member, said valve member being adjusted in its position upon rotation of said adjustment member;

a cover member supported by said valve housing to close over said gear assembly and having an opening through which said adjustment member projects;

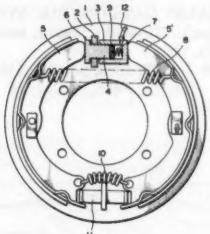
a position indicator rotatable relative to said adjustment member and encircling the same, said position indicator having a raised portion situated in said opening, said raised portion having a reference mark disposed thereon, and said position indicator also having an output gear portion engaging said small pinion gear within said cover member to be driven thereby; and

a stationary timing scale arranged in an arc alongside said opening in the cover member to provide a time delay reading for a selected position of the reference mark on said raised portion of said position indicator.

## 4,303,148
## SINGLE PISTON-CYLINDER DUO-SERVO DRUM BRAKE

**Ryuichi Iwasaki, Hanyu, Japan, assignor to Akebono Brake Industry Company, Ltd., Tokyo, Japan**

**Filed Nov. 13, 1979, Ser. No. 93,872**
**Claims priority, application Japan, Nov. 10, 1978, 53-138606**
**Int. Cl.³ F16D *51/00***
**U.S. Cl. 188—331** **2 Claims**



1. A duo-servo drum brake comprising:

a pair of brake shoes housed in and engaging a brake drum, each shoe having ends, said pair being arranged defining first adjacent ends and second adjacent ends,

an immovable anchor member disposed between said first adjacent ends,

a piston slidably engaged through said anchor member to push one of said first adjacent ends in a first brake engaging direction, movement of said piston in a direction opposite to the first brake engaging direction being limited by abutment of said piston with said anchor member,

a cylinder member slidably receiving said piston and defining therewith a chamber to receive brake fluid, said cylinder member being arranged to push the other of said first adjacent ends in a second brake engaging direction, movement of said cylinder member, in a direction opposite to the second brake engaging direction being limited by abutment of said cylinder member with said anchor member,

a strut member connecting said second adjacent ends to each other, and

means for supplying brake fluid under pressure to said chamber to create a braking force,

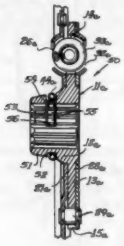
whereby said braking force is received by said anchor member because of an abutment of said piston or said cylinder member with said anchor member.

4,303,149

## CLUTCH DRIVEN PLATE WITH SPLINE LOCKING HUB

Thaddeus Lech, Jr., Sterling Heights, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Apr. 3, 1980, Ser. No. 136,849
Int. Cl.³ F16D 3/06
U.S. Cl. 192—70.19 9 Claims



1. In a clutch driven plate assembly including a hub having a barrel with an internally splined passage extending therethrough to receive the externally splined end of a shaft to be driven thereby, and a clutch plate operatively connected to said hub and carrying oppositely disposed friction facings adapted to be engaged by a flywheel and pressure plate on the opposite sides thereof, the internal hub splines and external shaft splines having backlash space therebetween, the improvement comprising a semi-circular segment adapted to engage the splined end of said shaft, said hub barrel having a semi-circular recess opening into the internally splined passage conformably receiving said segment, and resilient means squeezing said segment against said shaft to eliminate said backlash space.

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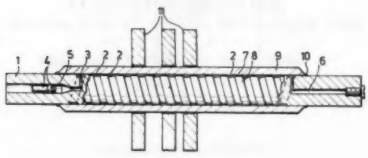
4,303,150

## COUPLING ASSEMBLY

Hans O. Olsson, Krondikesvägen 42B, Östersund, Sweden (83100)

Filed Dec. 7, 1979, Ser. No. 101,229
Claims priority, application Sweden, Dec. 11, 1978, 7812703
Int. Cl.³ F16D 1/06
U.S. Cl. 192—88 B 17 Claims



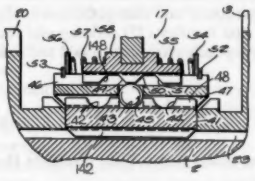
1. A pressurized hydraulic fluid actuated coupling assembly for detachably coupling to an element, said assembly comprising first and second concentric walls secured together at the ends thereof, the second wall adapted for engaging the element, one of said walls having grooves defining corresponding recesses between the first and second walls, ridges on said one wall being defined between adjacent recesses, means for introducing hydraulic fluid into the recesses and means for varying the pressure of the hydraulic fluid such that in the absence of fluid pressure, the ridges on said one wall are in contact with the other wall and upon pressurization of the fluid said second wall moves away from the first wall such that the second wall rigidly couples to the element and such that the ridges are spaced a predetermined distance from the other wall.

4,303,151

## POSITIVE LOCKING SHIFT COUPLER

Ferdynand Kolacz, New Berlin, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 17, 1979, Ser. No. 104,005
Int. Cl.³ F16D 13/60, 21/04
U.S. Cl. 192—114 R 10 Claims



1. A transmission clutch having a locking device comprising, a shaft, a clutch hub fixed to said shaft, a gear defining clutch teeth rotatably mounted on said shaft, a clutch sleeve slidably mounted on said clutch hub for selectively engaging said gear for connecting to said shaft, means defining a plurality of axially spaced recesses on said clutch hub, means defining radial openings angularly spaced in said clutch sleeve, at least one locking element in each of said openings of said sleeve, a locking ring embracing said clutch sleeve and defining ramp surfaces on its inner periphery formed by axially spaced notches and a central locking ridge for biasing said locking elements in said recesses of said clutch hub, centering springs biasing said locking ring to a centered position whereby said locking ridge locks said hub and said sleeve.

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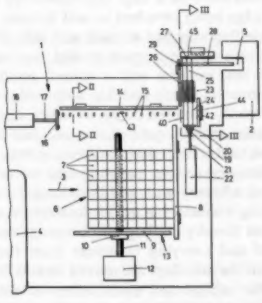
4,303,152

## FEEDER TABLE

Theo Widmaier, Ludwigstr. 15, 8191 Königsdorf, Fed. Rep. of Germany

Filed Apr. 2, 1980, Ser. No. 136,559
Claims priority, application Fed. Rep. of Germany, Apr. 5, 1979, 2913786
Int. Cl.³ B65G 25/00, 37/00; B65H 31/34
U.S. Cl. 198—485 7 Claims



1. A feeder table for a machine for processing two-dimensional objects in stacked arrangement, particularly for a label punching machine, comprising a thrust member for supplying individual pre-cut blank stacks to the receiving zone of said machine, characterized in that said receiving zone (5) of said machine (2) is vertically offset and/or inclined with respect to the plane of said table (1), that an upwardly directed arcuate slide path (23, 24, 25) extends between the plane of the feeder table and said receiving zone, that said thrust member (19) is adapted for movement along said slide path towards said re-

ceiving zone and is connected to an associated drive source (21, 22) for vertical movement and tilting movement about an axis (34) extending parallel to the table plane and transversely of the thrust direction, so that during transfer of a blank stack (7) along the arcuate portion (23) of said slide path it exerts a force on said stack tending to deform it by displacing the two-dimensional objects therein relative to one another parallel to the plane thereof, and is then automatically tilted to a position in which it is disposed substantially radial with respect to the arcuate portion of said slide path so as to align the blank stack against a stop member (27) defining said receiving zone and extending perpendicularly above said slide path.

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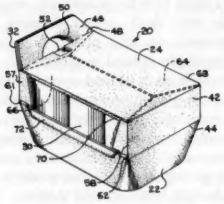
**4,303,153**

## INSULATED CARRYING CONTAINER FOR BEVERAGE CONTAINERS

**Gale E. Boulton, 16306 Sierra Trail, Hacienda Heights, Calif. 91745**

**Filed Nov. 26, 1979, Ser. No. 97,141**
**Int. Cl.³ B65D *25/00***
**U.S. Cl. 206—45.31** **12 Claims**



1. A thermally insulated carrying container for an assembled plurality of beverage containers, said carrying container being constructed substantially entirely of a thin plastic foam sheet material, said carrying container comprising:

a bottom and a top, said bottom forming an encasing section adapted to receive a number of beverage containers, said top being movable in respect to said bottom between an open position providing access into said encasing section and a closed position covering said encasing section, said top having a front and a back edge interconnected by side edges, said back edge being attached to said bottom; and

a separate side flap attached to each said side edge, each said flap being movable in respect to said top back and forth between a first position and a second position, said first position connecting each said flap with said bottom thereby forming a totally enclosed container when said top is in said closed position thereby not exposing said enclosed section to the ambient, said second position forming enlarged openings into said encasing section exposing said encasing section to the ambient, whereby with said flaps in said second position said carrying container is to be located in a refrigerated environment thereby cooling said beverage container, upon removal of said carrying container from the refrigerated environment the said flaps are moved to said first position to maintain the refrigerated environment in said totally enclosed container.

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**4,303,154**

## ADJUSTABLE CONTAINER FOR CIGARETTE PACKAGES

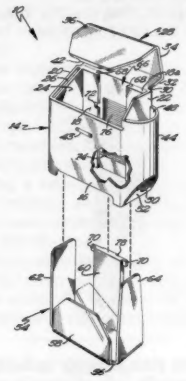
**Harlan D. Hicks, 520 E. Hamlin, West Salem, Wis. 54669**

**Filed Jan. 16, 1981, Ser. No. 225,733**
**Int. Cl.³ A24F *15/00*; B65D *85/10***
**U.S. Cl. 206—86** **12 Claims**

1. An adjustable container for cigarette packages, said container comprising:

a rectangular sleeve having a front, a back, and first and second sides;

a lid hingedly attached to said sleeve back;



a rectangular insert slidably located in said sleeve to accommodate cigarette packages of different lengths, said insert having means for snugly accommodating cigarette packages of differing widths.

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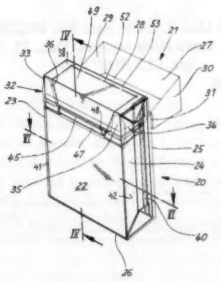
**4,303,155**

## CUBOID CIGARETTE OR CIGAR PACK

**Heinz Focke, and Kurt Liedtke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co., Verden, Fed. Rep. of Germany**

**Filed Jul. 2, 1979, Ser. No. 54,070**
**Claims priority, application Fed. Rep. of Germany, Jul. 29, 1978, 2833389**
**Int. Cl.³ B65D *85/10***
**U.S. Cl. 206—264** **4 Claims**



1. A flip-top cigarette pack, comprising:

(a) a rectangularly shaped outer container (20) formed from a blank of relatively stiff paper, cardboard or the like, and having an openable and closeable lid top (21) hingedly connected to an upper rear edge of the container,

(b) a collar (32) extending upwardly from the opposite sides and front face of an upper open mouth of the container, the collar fitting within the lid top when closed,

(c) a cut-out portion (36) defined in a front wall (35) of the collar,

(d) a rectangularly shaped inner wrapper (38) folded from a blank of moisture and aroma proof material and configured to fit closely within the outer container, all seams and flaps of the wrapper being tightly joined to hermetically seal the wrapper,

(e) an opening flap (49) disposed on adjoining top and upper front surfaces of the wrapper and defined by a tear line (52), and

(f) a freely projecting finger grippable tab (47) provided on an edge of the flap and extending laterally across the wrapper proximate the cut-out portion in the front wall of the collar,

(g) the tab being formed by an adhesively sealed overlap of the wrapper material, and being downwardly directed and overlying the front wall of the collar below the cut-out portion.

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**4,303,156**

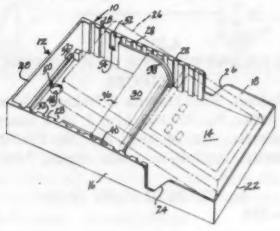
**ADJUSTABLE INCLINED CALCULATOR STAND**

**David J. Vucich, 2117 44th St., Highland, Ind. 46322**

**Continuation of Ser. No. 707,822, Jul. 22, 1976, abandoned. This application Aug. 5, 1980, Ser. No. 175,387**

**Int. Cl.³ F16M *15/00*; B65D *85/38***

**U.S. Cl. 206—305** **10 Claims**



1. A holder for a hand-type calculator comprising a casing adapted to receive said calculator and having a bottom wall, a front wall, a back wall and opposed side walls, each said side wall having a plurality of recesses; and a standard removeably mountable in at least one of said recesses in each of said side walls (1) in at least one horizontal position to support said calculator in a low angular attitude and (2) in at least one vertical position to support said calculator in a higher angular attitude.

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**4,303,157**

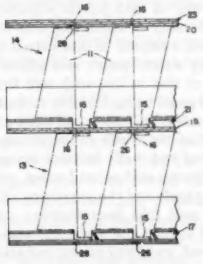
**SHIPPING CARTON ASSEMBLY FOR AUTOMOBILE TAILLIGHT ASSEMBLIES**

**Fred S. Edwards, R.D. #3, Hickory Dr., Conneaut Lake, Pa. 16316**

**Filed Jan. 10, 1980, Ser. No. 110,903**

**Int. Cl.³ B65D *85/68, 81/02***

**U.S. Cl. 206—335** **14 Claims**



1. A package for automobile taillight assemblies comprising,

a carton adapted to contain two tiers of said assemblies,

a first tier and a second tier of said assemblies comprising a plurality of assemblies disposed in parallel relation to each other,

each said assembly being nested within the assembly adjacent to it,

a first elongated rectangular board, disposed at one side of said carton, and supported on the bottom thereof,

a second rectangular board (adapted to be) supported on the bottom of said carton, at a side opposite said first rectangular board and spaced from said first rectangular board and disposed generally parallel to said first rectangular board,

the ends of said first tier of assemblies resting on said rectangular boards,

a third rectangular board and a fourth rectangular board resting on the ends of said first tier of assemblies on the side thereof opposite said first rectangular boards and second rectangular boards and means on the ends of said taillight assemblies engaging recesses in each of said rectangular boards, said rectangular boards holding said taillight assemblies in spaced relation to each other.

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**4,303,158**

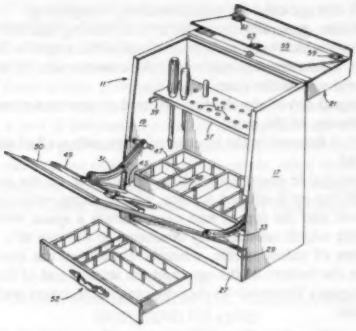
**TOOL BOX**

**Donald R. Perkins, 6 Hammond Rd., Natick, Mass. 01760**

**Filed Sep. 24, 1979, Ser. No. 77,903**

**Int. Cl.³ B65D *85/20*; A45C *5/12***

**U.S. Cl. 206—373** **1 Claim**



1. A tool box for screwdrivers, wrenches other small hand tools and other associated articles comprising a box-like structure having:

a. a bottom wall,

b. a back wall,

c. a pair of opposed trapezoidally shaped side walls,

d. a top cover hingedly connected at its back edge for swinging movement from an open position to a closed position, said top cover including a storage compartment having a cover hingedly connected to said top cover for holding small articles and a carrying handle,

e. a front wall,

f. a front cover located above the front wall hingedly connected at its bottom edge to the top of the front wall for swinging movement from an open position to a closed position,

g. latch means for securing the top cover to the front cover,

h. a lower shelf for supporting a tray,

i. an upper shelf having a plurality of openings into which can be inserted screwdrivers or similar tools and maintained therein in an upright position,

j. a pair of friction lid hinges connected between said front cover and said side walls for limiting movement of said front cover,

k. a removable tray adapted to be mounted on said lower shelf and having compartments adjustable in size,

l. a pull-out drawer having adjustable compartments located underneath the lower shelf and removable from the front of the tool box, and

m. magnetic means on the inside of said front cover for supporting tools and the like in an upright position.

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**4,303,159**

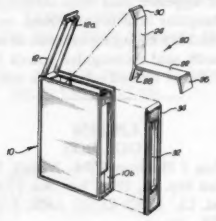
## VIDEO PACKAGE

**S. Gerald Stone, Los Angeles; Robert M. Emerson, N. Hollywood, and Rollin Binzer, Calabasas, all of Calif., assignors to National Video Group, Ltd., Los Angeles, Calif.**

**Filed Jun. 2, 1980, Ser. No. 155,400**

**Int. Cl.³ B65D** *85/672*

**U.S. Cl. 206—387** **4 Claims**



1. A storage case for videocassettes, comprising:

a plastic, generally rectangular case having interior dimensions which substantially conform to the size of a first type of videocassette, whereby said cassette can be securely held within the case;

a hinged cover attached to the case to permit access to the interior of the case;

a notch formed on the interior of a first side wall of said case; and

a removable insert located in the interior of the case and having an L-shaped surface which, along with a second wall and the top of said case, defines a space within the case which substantially conforms to the size of a second type of videocassette, wherein one end of the insert rests on the bottom of the case and the second end of the insert engages the notch to thereby secure the insert within the case.

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**4,303,160**

## PACKAGE FOR SINGLE FILM STACK

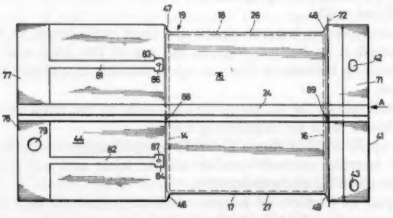
**Herbert Weindanz, Odenthal, and Horst Auf dem Graben, Cologne, both of Fed. Rep. of Germany, assignors to N.V. Optische Industrie "De Oude Delft", Delft, Netherlands**

**Filed Jul. 5, 1978, Ser. No. 922,012**

**Claims priority, application Fed. Rep. of Germany, Jul. 8, 1977, 2730881**

**Int. Cl.³ B65D** *85/00, 85/30, 85/62*

**U.S. Cl. 206—455** **12 Claims**



1. In a package for loading a stack of individual rectangular films into a cassette which has an internal cutter for opening the package transversely to release the film stack within the cassette and at least one internal blade for cutting the package longitudinally to hold the film in the cassette as the opened package is extracted from the cassette, said package having:

a retaining strip,

a first transverse weld,

a waisted middle part following the first transverse weld for accommodating the film stack,

a pull tab having upper and lower sheets, adjoining and following the waisted middle part, and

a second transverse weld in the pull tab; the improvement for use with a cassette having a pair of rollers for extracting the package from the cassette after it has been opened, comprising:

at least one longitudinal weld connecting the upper and lower sheets of the pull tab in the zone of the pull tab which is pierced by the longitudinal blade,

the longitudinal weld running at least as far as the second transverse weld, and

the pull tab forming means drawn between the extraction rollers for extracting the package from the cassette.

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**4,303,161**

## HANDLING MEANS FOR USE IN HANDLING PLANAR OBJECTS

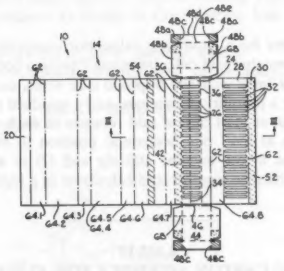
**Joachim L. Rohloff, Shvil Hashita 4, Naharya, Israel**

**Continuation of Ser. No. 902,903, May 5, 1978, abandoned. This application Jan. 14, 1980, Ser. No. 111,702**

**Claims priority, application South Africa, May 10, 1977, 77/2778**

**Int. Cl.³ B65D** *69/00, 71/00*

**U.S. Cl. 206—578** **6 Claims**



1. A blank for constructing a holder comprising:

blank materiai of rectangular shape, said material including a first set of a plurality of parallel fold lines parallel to one edge of said blank material, two of said fold lines forming first and second flaps at opposite edges of said blank material, said fold lines forming a plurality of panels between said flaps, one of said panels adjacent one of said flaps having a plurality of transverse slits extending the width of said panel, a second of said panels separated from said one panel by a third panel, said second panel also having a plurality of slits in line with said first plurality of slits, said second panel being foldable at the center of said panel and at the ends of said slits, said third panel having a width narrower than the width of the remaining of said panels;

first and second end walls foldable connected to said blank material adjacent said second panel, whereby the remaining of said panels and the remaining of said flaps are foldable along said fold lines forming an enclosure having ends closed by said end walls and square in cross-section;

said one, second, and third panels and said one flap folded to form an interior lining for said enclosure with the slits of said one and second panels opposite each other for retaining planar objects between said slits, and

said blank material including a second set of fold lines dividing said blank into another set of panels, said other set of

panels being foldable into a receptacle having a rectangular section for storing planar objects.

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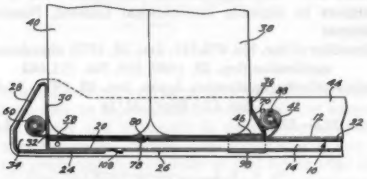
**4,303,162**

## FORWARD FEED MERCHANDISING DEVICE FOR SOFT DRINK BOTTLES

**James M. Suttles, Elberton, Ga., assignor to The Mead Corporation, Atlanta, Ga.**

**Filed Aug. 13, 1979, Ser. No. 65,931**
**Int. Cl.³ A47F *1/00***
**U.S. Cl. 211—49 D** **10 Claims**



1. Apparatus having the capability of supporting a plurality of upstanding bottles arranged in a generally horizontal column and automatically feeding the bottles in the column forward in a columnwise direction when the foremost bottle in the column is removed, comprising:

means providing a substantially rigid supporting surface for supporting a column of bottles;

means for guiding bottles supported by the supporting surface for movement in a columnwise direction parallel to said surface;

pusher means comprising a vertically extending member having a front side for engaging the rearmost bottle in the column, and a rear side;

guide means constraining the pusher means for movement in a columnwise direction;

means for stopping the movement of the column when the foremost bottle reaches a predetermined position relative to the supporting surface;

spring means urging said pusher means in a forward columnwise direction, said spring means comprising a self-coiling strip of spring material secured at one end to the supporting surface near the forward end thereof, extending rearwardly to a location behind said pusher means, and being coiled at said location, the coil being arranged to exert a forwardly directed force on the rear side of the pusher means, the force being sufficient, in any position within the range of movement of the pusher means, to move all of the bottles between the pusher means and said predetermined position in a forward columnwise direction until the foremost bottle reaches said predetermined position; and

means comprising a length of flexible sheet material secured to the pusher means and extending forwardly therefrom along said supporting surface, said sheets being positioned underneath the bottles and between the bottles and the rigid supporting surface when bottles are present in the column, and serving substantially to eliminate variations in the coefficient of friction between the bottles and the supporting surface by preventing direct contact between the bottles and the supporting surface;

said length of flexible sheet material also extending over the rear side of the pusher means between said rear side and the coil of the spring means, whereby the flexible sheet material also serves as a bearing surface for said coil.

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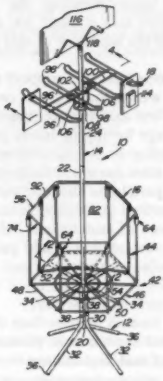
**4,303,163**

## COLLAPSIBLE DISPLAY RACK

**Jack C. Henry, Downington, Pa., assignor to Leon L. Berkowitz Co., Glenside, Pa.**

**Filed Jun. 27, 1979, Ser. No. 52,899**
**Int. Cl.³ A47F *5/13***
**U.S. Cl. 211—133** **15 Claims**



1. A collapsible display bin comprising a base, a plurality of frame members pivotally mounted on said base, said frame members being pivotable to a vertical position, and spaced from one another, means linking said frame members at their tops to form a loop with said tops and to maintain said frame members in said vertical position, each of said frame members having a pair of brackets secured at the top thereof, with one bracket of said pair being on one side of said frame member and the second bracket of each pair being on the other side of said frame member, said brackets being releasably connected to said linking means, and a flexible receptacle supported by said loop.

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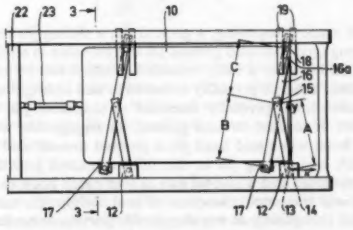
**4,303,164**

## STRUCTURE FOR DAMPING THE OSCILLATION OF BUILDING CRANES

**Rickard Andersson, Vesteras, and Ove Danerlov, Söderhamn, both of Sweden, assignors to Linden-Alimak AB, Vesteras, Sweden**

**Continuation-in-part of Ser. No. 853,963, Nov. 22, 1977, abandoned, which is a continuation of Ser. No. 608,924, Aug. 29, 1975, abandoned. This application Aug. 22, 1978, Ser. No. 935,871**
**Int. Cl.³ B66C *13/06***
**U.S. Cl. 212—146** **3 Claims**



1. In a tower crane lifting device which includes

a substantially vertical tower supporting a horizontally extending jib intermediate its ends, said jib being composed of a main jib and a counter jib,

a carriage fitted with a load lifting device that is movable along said main jib and supported thereby,

a counterweight mass,

support means on said counter jib for supporting said counterweight mass on said counter jib so that the counterweight can move essentially longitudinally back and forth along a limited path that is approximately parallel to the longitudinal axis of the counter jib,

damping means interconnecting the supported counterweight mass with said counter jib, said damping means serving to resist the tendency of said counterweight mass to swing,

the improvement being that said support means includes

(1) a first linkage which has its lower end pivotally attached by means of a first axle to said counter jib, and

(2) a second linkage having its lower end mounted in supporting relationship to the counterweight mass so that the counterweight mass can move through a limited arc that is approximately parallel to the longitudinal axis of the jib,

(3) a generally vertical guideway mounted on said counter jib, the upper end of said second linkage being mounted for vertical movement within said guideway.

(4) pivot means adjacent the upper end of said second linkage so that said upper end can pivot while moving along said generally vertical guideway,

(5) a second axle located intermediate the ends of said second linkage, said second axle pivotally interconnecting the upper end of said first linkage to said second linkage.

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**4,303,165**

## CRANE WITH TELESCOPIC JIBS

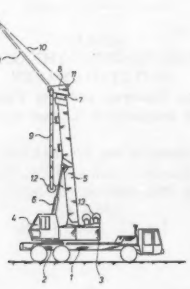
**Dietrich Cassens, Arfrade, and Hans-Werner Dowedeit, Mollhagen, both of Fed. Rep. of Germany, assignors to O&K Orenstein & Koppel Aktiengeselischaft Werk Lübeck, Fed. Rep. of Germany**

**Filed Dec. 26, 1978, Ser. No. 973,024**

**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1977, 2757954**

**Int. Cl.³ B66C *23/42***

**U.S. Cl. 212—184** **2 Claims**



1. A crane comprising, a ground jib, a sliding jib telescopically engaged with said ground jib and movable in a telescopic direction between a fully retracted position and an extended position, a head jib pivotally mounted to said sliding jib, at least one catch hook pivotally mounted to said head jib, a catch member connected to said ground jib engageable with said catch hook when said head jib is pivoted toward said ground jib with said sliding jib in the fully retracted position, said catch member and a pivotal axis of said catch hook extending along said telescopic direction of said sliding jib, said catch member comprising an angular profile portion extending from said ground jib a spring connected to said catch hook for biasing said catch hook into a position of engagement between said catch hook and said catch member, said angular profile piece having a tapered extending plate for engagement with said catch hook when said sliding jib is extended from said ground jib to disengage said catch hook from said catch member, a first guide piece connected to said head jib, a second guide piece connected to said ground jib and spaced from said angular profile piece for receiving said first guide piece between said second guide piece and said angular profile portion for aligning said catch hook with said catch member when said catch hook and catch member are engaged, and a bolt detachably connected between said angular profile portion and first first and second guide pieces when said catch hook is engaged with said catch member for locking said head jib to said ground jib.

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**4,303,166**

## HORIZONTAL SLEWING CRANE

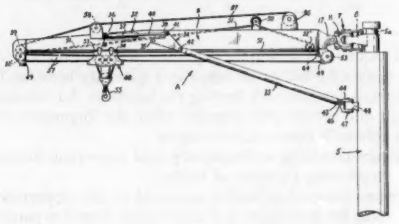
**George T. R. Campbell, Nassau, The Bahamas; Kosaku Ohno, Asaka, and Toshishige Kasuga, Kawasaki, both of Japan, assignors to Algoship International Limited, Nassau, The Bahamas**

**Continuation of Ser. No. 870,811, Jan. 18, 1978, abandoned. This application Sep. 29, 1980, Ser. No. 191,443**

**Claims priority, application Japan, Jan. 18, 1977, 52-4336**

**Int. Cl.³ B66C *23/54***

**U.S. Cl. 212—233** **2 Claims**

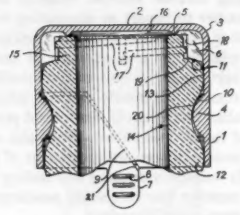


1. A crane having a vertical post; boom means; hinge means connecting the boom means to the post, the hinge means including a support arm mounted on the top of the post and projecting horizontally therefrom, a first vertically disposed pivot pin secured on the outer portion of the support arm, and an intermediate member pivotally mounted at one end on the vertical pivot pin for horizontal movement about the vertical pin, the intermediate member supporting a horizontal pivot pin at its other end; the inner end of the boom means pivotally mounted on the horizontal pivot pin for vertical movement about the horizontal pin; a support member projecting outwardly from the top of the vertical post at right angles to the support arm; moving means for moving the boom means about the pivot pin between a first position where it is substantially at right angles to the support arm on one side of it and a second position where it is substantially at right angles to the support arm on the other side of it; the moving means pivotally mounted at one end to the free end of the support member, the other end pivotally mounted with first vertical pivot means to the free end of first straight link means; the other end of the first straight link means pivotally mounted with second vertical pivot means to the support arm; the first straight link means comprising a pair of vertically-spaced apart horizontal links with the upper link located above the vertical point pin and the lower link located below the vertical pivot pin so as to pass the vertical pivot pin when the boom means moves between the first and second positions; second straight link means, the second straight link means pivotally mounted at one end with third vertical pivot means to the free end of the first straight link means, adjacent the other end of the moving means; the other end of the second straight link means pivotally mounted with fourth vertical pivot means to the intermediate hinge member, the fourth vertical pivot means located adjacent the horizontal pivot pin and spaced from the vertical pivot pin.

## 4,303,167
## TEARABLE BOTTLE CAPS

Francisco P. Martinez, Callejon de Pino Suarez 1636, Colonia Libertad, Tijuana, B.C., Mexico

Filed Mar. 21, 1980, Ser. No. 132,590
Int. Cl.[3] B65D *41/48*
U.S. Cl. 215—256 7 Claims



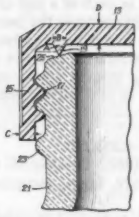
1. A tearable bottle cap for large capacity bottles comprising a top planar disk, an approximately cylindrical skirt depending from said planar disk to snugly fit around the neck of the bottle, a slant score line starting at the lower edge of said skirt, a pull tab projecting downwardly of said lower edge of the skirt, one of the side edges of the pull tab being arranged to terminate at the point on said lower edge of the skirt where the score line starts, an inner solid bead having an arcuate surface and extending throughout the circumference of said skirt at a predetermined distance from said top disk, in order to engage the lower portion of the upper bead of a bottle neck, a plurality of vertical, radially inwardly directed lugs projecting from the corner between said top disk and said skirt and having a slant lower edge, in order to engage the upper portion of the upper bead of a bottle neck, said lugs being equidistantly provided around the periphery of said disk and having a width such that they will accomodate therebetween the upper terminal portion of a threaded bottle neck, said radially inwardly directed lugs also serving as rigidifying elements for the upper portion of the cap in order to provide a shock absorber when the cap is used with unthreaded neck bottles, and a circumferential internal rib projecting from the inner surface of said top disk, said internal rib being of a diameter such that the upper edge of the terminal portion of a threaded neck bottle will abut thereon, in order to serve as a shock absorber for the upper edge of the bottle neck when the cap is used with threaded neck bottles, said radially inwardly directed lugs serving as rigidifying elements of the upper portion of the cap by abutment on the outer edges on the threads of the terminal portion of the threaded neck bottle, in order to avoid sidewardly directed movements of the cap.

## 4,303,168
## LINERLESS CLOSURE WITH CRUSHABLE SEAL

Gerald L. Roy, Lancaster, Pa., assignor to Kerr Glass Manufacturing Corporation, Lancaster, Pa.

Filed Jun. 21, 1977, Ser. No. 808,480
Int. Cl.[3] B65D *41/04*
U.S. Cl. 215—344 6 Claims

1. A linerless closure for sealing a glass finish on a glass container having an external screw thread for threadably receiving said closure, said closure comprising a one piece body of polypropylene having a top end wall for extending across the open top of a container, a dependent skirt wall integrally joined to said top end wall about the outer circumference of said top end wall, an integral screw thread formed on the inner side of said skirt wall for threading engagement with the external screw thread on a glass container, a rigid V-shaped sealing fin projecting downwardly from said top end wall, said V-shaped sealing fin being substantially triangular shaped in cross section and being rigid to transmit closure torque loading forces applied thereto to said top end wall, said V-shaped sealing fin having a lower sealing end for sealing engagement with the container finish, said end having a radius of 0.005 inch or less than 0.005 inch and having upwardly extending walls defining an apex angle within the range of 40° to 60° and having a cross-sectional width in the range of 0.04 to 0.06 inch at the juncture of the fin of said top end wall, and being formed of polypropylene having a compressive strength of less than about 15,000 psig to define a crushable end to flatten and to cold flow and to permanently deform into a width at least several times greater than 0.005 inch with conventional closure torques and thereby to seal with imperfections in said finish, said top end wall having a thickness of at least about 0.070 inch from the juncture of said skirt wall and top end wall to at least the

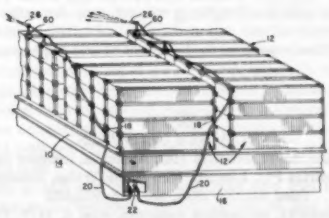


sealing ring diameter and said skirt wall having a thickness of at least 0.048 inch to withstand compressive forces in the range of 18,000 to 24,000 psig generated during the crushing and permanently deforming of the sealing fin by automatic capping machines, said crushable end being rigid and non-bending, said threads and said skirt wall being formed of polypropylene having a flexural stiffness of at least 175,000 psi to prevent flaring of the skirt wall when permanently deforming said crushable end against said container finish, said V-shaped annular sealing ring being the only sealing surface on said closure for sealing with said container finish.

## 4,303,169
## SAFETY CONTROL SYSTEM FOR CONTAINER OPERATIONS

Vincent G. Grey, Falls Church, Va.

Filed Jul. 6, 1978, Ser. No. 922,208
Int. Cl.[2] B65D *88/00*
U.S. Cl. 220—1.5 14 Claims



1. An anchoring device adapted to be releasably mounted on a corner fitting of a container including a plurality of apertures providing openings to a hollowed-out interior of said corner fitting along mutually perpendicular axes, said anchoring device including

a) a body having

(1) bearing means at one end for bearing engagement with inner and outer surfaces of said corner fitting adjacent an aperture, said bearing means including

(i) a plate received over an aperture for support on the outer surface of said corner fitting, and

(ii) a latch received in said hollowed-out interior, said latch adapted to be rotated between a first position and a second position for engagement within the

hollowed-out interior with the inner surface on opposite sides of said aperture, and

(2) means at the other end of said body adapted for mounting safety control means;

b) means cooperating with said body including

(1) a shaft, said shaft extending through and rotatable relative to said plate and supporting said latch at one end for conjoint rotation,

(2) a handle for rotating said latch between said positions, and

(3) means mounting said handle on said shaft; and

c) a base unit comprising a part of said body surrounding said shaft and formed to a truncated, pyramidal outline, means defining a slot in each of a pair of adjacent sides of said base unit communicating at the junction of the sides, each slot terminating in a depending latching length, and said handle extending through said slot and movable into and between latching lengths which comprise said first and second positions of said latch, respectively.

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**4,303,170**

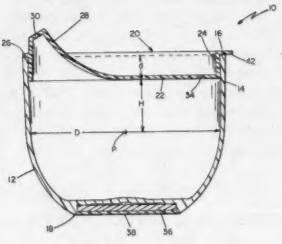
**SELF-RIGHTING TRAINING CUP**

**Richard L. Panicci, Hanover, Mass., assignor to Kiddie Products, Inc., Avon, Mass.**

**Filed Dec. 26, 1979, Ser. No. 106,839**

**Int. Cl.³ A47G *19/22***

**U.S. Cl. 220—70** **9 Claims**



1. A self-righting cup having a lower portion and an upper portion, said lower portion having a flat defining the bottom of said cup and a rounded sidewall extending upwardly therefrom, said upper portion having a sidewall which extends upwardly from said rounded sidewall of said lower portion, wherein to assure self-righting of said cup, the ratio of the outer diameter of said cup at the point of intersection of said upper and lower portions to the height of said upper portion is at least 4.

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**4,303,171**

**CONTAINER CLOSURES**

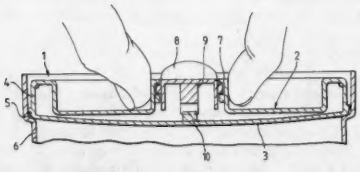
**Paul M. Schremmer, Hunters Hill, Australia, assignor to Aladdin Industries Pty. Limited, New South Wales, Australia**

**Filed Jul. 25, 1980, Ser. No. 172,638**

**Claims priority, application Australia, Aug. 3, 1979, PD9879**

**Int. Cl.³ B65D *53/00***

**U.S. Cl. 220—238** **6 Claims**



1. A closure member for an open-ended container comprising a resilient bottom closure member in which the outer edge thereof constitutes sealing means sealable against the inside wall of said container, and a top closure member interconnected with said resilient bottom closure member, said top closure member including a central pivotally mounted rocker or toggle adapted to operate a downwardly extending cam member and said bottom closure member including a central upwardly extending buttress member adapted to cooperate with said cam member to impart an alternating movement in said closure member from either a sealing position or an unsealed position, wherein in one position of said pivotally mounted rocker said sealing means of said resilient bottom closure member remain in sealable contact with the inside walls of said container and wherein in a second position of the pivotally mounted rocker said cam member acts on said buttress member to cause a downward movement of the buttress and to substantially uniformly displace said sealing means such that said closure member can be readily positioned in or removed from the open-ended container.

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**4,303,172**

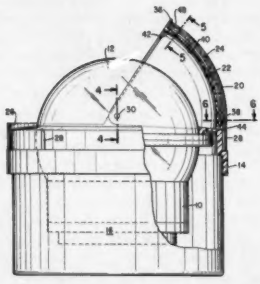
**COMPASS HOOD**

**James M. Bosland, 189 Chestnut Dr., Wayne, N.J. 07470**

**Continuation of Ser. No. 945,849, Sep. 26, 1978, abandoned. This application Aug. 13, 1980, Ser. No. 177,570**

**Int. Cl.³ B65D *43/14***

**U.S. Cl. 220—252** **6 Claims**



1. A hood construction for use with a compass having an annular compass ring, comprising:

a stationary hood segment including a spherical sector and an annular base adapted to be secured to a mounting member,

outer and inner hood sectors pivotally mounted interiorally of said spherical sector, said hood sectors being rotatable relative to each other and relative to said spherical sector, said hood sectors and spherical sector forming a hemispherically shaped hood for said compass when fully extended,

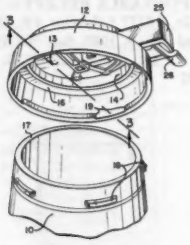
projections extending between the exterior of said outer hood sector and the interior of said spherical sector, providing friction therebetween to hold said outer hood sector in any position between fully extended and fully retracted, relative to said spherical sector, and projections extending between the exterior of said inner hood sector and the interior of said outer hood sector, providing friction therebetween to hold said inner hood sector in any position between fully extended and fully retracted, relative to said outer hood sector.

**4,303,173**

## MUG TYPE DRINKING RECEPTACLE WITH COVER AND VALVE

**Orv B. Nergard, Fridley, Minn., assignor to Dart Industries Inc., Los Angeles, Calif.**

**Filed Jul. 2, 1979, Ser. No. 54,321**
**Int. Cl.³ A47G *19/22***
**U.S. Cl. 220—254** **3 Claims**



1. A mug type drinking receptacle with cover and valve assembly, including, in combination:

(a) a drinking receptacle having an open top and laterally extending handle on one side;

(b) a flat plate and surrounding rim defining a cup-shaped cover for closing off said open top of said receptacle, said plate having an opening adjacent to a first point of said rim, said receptacle and cover having inter-engaging means for removably securing said cover to said receptacle in a position in which said opening is circumferentially spaced 90° from said handle;

(c) a valve head beneath said opening in said plate having resilient support means secured to the bottom surface of said plate biasing the valve head upwardly against the bottom periphery of said opening to normally close said opening; and

(d) an actuating member passing through a side opening in said rim beneath the undersurface of said plate at a point circumferentially spaced 90° from said opening so as to fall in vertical alignment with said handle, said member terminating in a camming surface engaging a portion of said valve head such that when said member is urged upwardly through said side opening in said rim, it cams said valve head away from said opening to thereby open the same so that a person can drink a beverage from said receptacle by holding said handle with one hand in the manner of a mug and operating said actuating member with the thumb, said resilient support means further including an integrally formed resilient strip biased into a curve lying in a plane parallel to the underside of said plate, the extending end of said strip engaging said actuating member to bias it outwardly as a result of said strip tending to straighten.

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**4,303,174**

## FOOT OPERATED CONTAINER AND COVERING DEVICE

**Howard A. Anderson, Pittsburgh, Pa., assignor to Cities Service Co., Tulsa, Okla.**

**Filed Jan. 11, 1980, Ser. No. 111,425**
**Int. Cl.³ B65D *43/26***
**U.S. Cl. 220—263** **4 Claims**

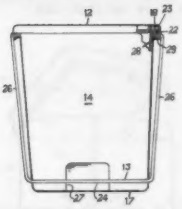
1. A three element receptacle for receiving material comprising:

(a) a container having an opening;

(b) a covering pivotally mounted on the opening;

(c) a substantially U-shaped operating member straddling the container and having both ends rotably connected to the covering;

wherein the walls of the container which define the opening has at least one bearing surface upon which the cover is pivoted; wherein the covering has an element which rides on the at least one bearing surface when the cover is pivoted wherein the operating member can be actuated to cause the covering to



pivot on the bearing surface to open and/or close te container; and wherein the covering has ears to which the operating member is attached and the ears are mounted through a rim of the container.

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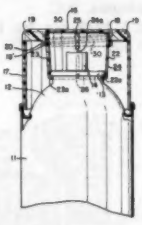
**4,303,175**

## OVERCAP ASSEMBLY FOR VALVED CONTAINERS

**William J. Lux, Holland, Pa., assignor to Philmac Corporation, Philadelphia, Pa.**

**Filed Apr. 28, 1980, Ser. No. 144,350**
**Int. Cl.³ B65D *41/04*; B67D *5/32***
**U.S. Cl. 220—288** **10 Claims**



1. For a container having an end with an annular bead, an overcap assembly, comprising:

a cup-shaped cap member having an end wall adapted to overlie said container end and a sidewall depending from said end wall,

means carried by said cap intermediate its end wall and said container providing at least a pair of legs, said legs having lugs releasably engaging beneath said container bead and diverging in an upward direction from said bead,

means connecting said legs together intermediate said cap end wall and said container bead to provide a fulcrum for said legs,

means in said cap threadly engaging said legs above said fulcrum for applying inward pressure to said legs above their fulcrums as the cap rotates to cause the lugs to disengage said container bead to afford removal of said cap from said container.

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**4,303,176**

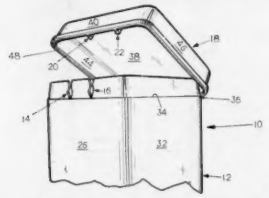
## UNITARY CONTAINER WITH IMPROVED LID ORIENTATION AND LOCKING MEANS

**Peter T. Swartzbaugh, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Filed Jul. 7, 1980, Ser. No. 166,625**
**Int. Cl.³ B65D *41/16, 41/18***
**U.S. Cl. 220—306** **13 Claims**

1. A selectively openable and closable container molded as a unitary structure, said container comprising:

a shaped hollow main body member, said main body member having at least one vertical motion restraining member accepting portion disposed on the upper edge;
a matching shaped hollow closure member;
a hinge member integrally connecting said closure member with said main body member; and



a locking member on said closure member including an outboard vertical motion restraining member of the same shape as said vertical restraining member accepting portion, in registry with said vertical restraining member accepting portion and further including an inboard horizontal motion restraining member adjacent said outboard vertical motion restraining member.

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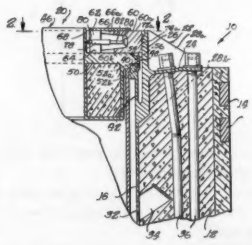
**4,303,177**
**CAVITY CLOSURE ARRANGEMENT FOR HIGH PRESSURE VESSELS**
**Hans H. Amtmann, San Diego, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**
**Filed Mar. 5, 1979, Ser. No. 17,418**
**Int. Cl.[2] B65D *85/46***
**U.S. Cl. 220—323** **10 Claims**



1. In a pressure vessel having at least one pressure cavity therein defining an access opening, the combination therewith comprising,
mounting ring means fixedly secured to said vessel circumferentially of said access opening, said mounting ring means defining a support surface extending substantially circumferentially of said opening,
a closure adapted for cooperation with said mounting ring means so as to be supported by said support surface in a manner to close said access opening,
said mounting ring means defining at least one internal locking groove therein,
a plurality of locking blocks carried by said closure for pure radial movement between first positions spaced from said mounting ring means when said closure is mounted on said support surface and second positions cooperating with said locking groove, each of said locking blocks having at least one locking projection thereon adapted for releasable interengagement with said locking groove in said mounting ring means when said locking blocks are moved radially to said second positions,
and discrete actuator means cooperative with each of said locking blocks and operative to effect radial movement thereof between said first and second positions, said locking projections on said locking blocks having ramp surfaces thereon operative to effect biased movement of said closure toward said support surface so as to increase the sealing relation therebetween as said locking blocks are moved to their said second positions.

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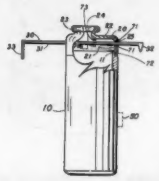
**4,303,178**
**PORTABLE RECEPTACLE**
**Fisher A. Ford, Jr., 13727 Labrador #B, Houston, Tex. 77047**
**Filed Jun. 9, 1980, Ser. No. 157,676**
**Int. Cl.[3] B65D *43/20***
**U.S. Cl. 220—345** **3 Claims**



1. A portable sputum receiving receptable comprising:
a cylindrical, open ended, fluid receiving body, having means at its open end for receiving a cap;
a hollow, open ended, cap member removably affixed to the open end of said body, said cap member comprising a cylindrical skirt, a top, a sputum receiving aperture through said top and oppositely positioned cutouts in said skirt;
a slidable lever extending through and outwardly of both said cap cutouts, said lever having (a) an aperture therethrough normally misaligned with said cap aperture, (b) a pressure receiving flange at one end for permitting a force to cause sliding of said lever thereby aligning said cap and lever apertures, and (c) means for fixedly positioning said lever to a car window, said positioning means comprising a flange depending and approximately normal to said lever at its other end, whereby said flange may be inserted intermediate the window glass and frame; and
spring means for biasing said lever toward a position wherein said cap and lever apertures are misaligned.

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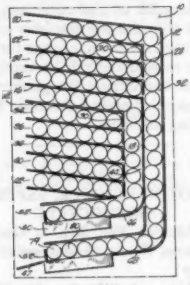
**4,303,179**
**HIGH DENSITY CAN STACK FOR AUTOMATIC CAN VENDERS**
**Carl E. Spring, La Crosse, Wis., assignor to La Crosse Cooler Company, La Crosse, Wis.**
**Filed Jan. 4, 1980, Ser. No. 109,443**
**Int. Cl.[3] G07F *11/12***
**U.S. Cl. 221—7** **5 Claims**

1. In a coin operated vending machine having a frame and a plurality of container storage racks supported on said frame and arranged in side by side relationship, the improvement wherein each of said racks have first and second independent storage sections and each section having an independent delivery channel which delivers containers to an outlet, said first section including a plurality of inclined slant storage shelves communicating with a generally vertical discharge channel and including gates for each of said shelves other than the top shelf, wherein said second section delivery channel is generally vertical and aligned in parallel relationship with said first channel and located forwardly thereof and said second section including a plurality of slant storage shelves below said first section slant shelves and feeding into said second section vertical channel and including gates for said slant shelves other than the uppermost slant shelf in said second section, and wherein said delivery channels have inclined discharge ramps extending beneath the slant shelves, vend mechanisms for each deliv-

ery channel, and control means including a common selector switch, an electrical circuit coupled to said vend mechanism of each channel to provide a delivery sequence in which a selected quantity of stored containers from said first storage section is delivered initially, and means in said circuit disabling said vend mechanism for said first section and enabling said vend mechanism for said second section until a selected quantity of containers is delivered from said second system before



again enabling said vend mechanism of said first system to insure that the containers initially loaded into the vending machine are discharged prior to discharge of containers loaded at a later date so that the first containers loaded are the first containers discharged to maintain the freshness of the stock and wherein the zone between the uppermost slant shelf of the first section and the lowermost slant shelf of said second section is completely occupied by slant shelves to maximize the storage capacity of said vending machine.

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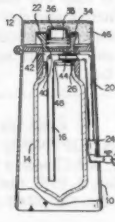
**4,303,180**

## VACUUM INSULATED, HEAT RETAINING, LIQUID DISPENSING BOTTLE

**Jin Y. Sheu, No. 795, Dong Dah Rd., Shin Jwu City, Taiwan**

**Filed Jul. 2, 1979, Ser. No. 54,082**
**Int. Cl.³ B67D *5/54***
**U.S. Cl. 222—204** **3 Claims**



1. A vacuum insulated, heat retaining bottle which can readily supply water from an erect position comprises an outer bottle body, a bottle cover, an internal bottle installed within the bottle body and spaced therefrom to preclude heat loss therefrom, a siphon pipe extending deeply into the internal bottle, a discharge pipe extending substantially entirely inside the outer body with an upper end connected to the siphon pipe and a lower end extending out of the outer bottle body, said lower end having a discharge valve, and said bottle having a stopper with a compressed air mechanism so that after the internal bottle is filled with water to the extent that the siphon pipe and the discharge pipe are filled, the bottle is enabled to discharge or stop discharging water when the discharge valve provided outside of the bottle body is switched on or switched off, wherein the bottle stopper is designed to be a centrally spaced ring housing, having an opening on its top side and air holes on its bottom side, said ring housing being equipped within its inner side with a ring shaped member closely engaging with the housing and extending upward as a pressing portion and including a coil compressed spring set on the bottom side of the ring shaped member within the housing.

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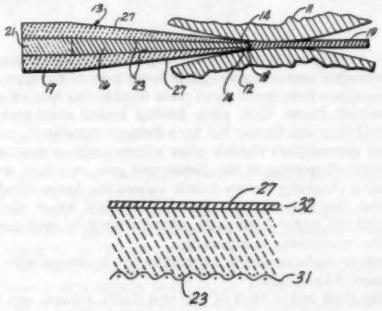
**4,303,181**

## CONTINUOUS CASTER FEED TIP

**William R. Lewis, Riverside; Dennis M. Smith, Crestline, and Wendell G. Jenness, Riverside, all of Calif., assignors to Hunter Engineering Company, Riverside, Calif.**

**Filed Nov. 2, 1978, Ser. No. 957,185**
**Int. Cl.³ B22D *11/06***
**U.S. Cl. 222—591** **12 Claims**



1. A molten metal feed tip for a continuous caster comprising:

a pair of generally rectangular refractory members each having a downstream edge portion and an upstream edge portion, each of the members being formed of a felt of refractory fibers rigidly bonded together, the felt of refractory fibers being compressed to a greater density adjacent the downstream edge portions than the upstream portions of said members; and

means adjacent the upstream portion for spacing the pair of members apart for forming a metal feeding gap between the members and admitting molten metal into such gap for flow towards the downstream edge portions; and

wherein the thermal conductivity of the felt of refractory fibers progressively increases from the upstream portions towards the downstream edge portions.

2. A molten metal feed tip for a continuous caster comprising:

a pair of generally rectangular refractory members each having a downstream edge portion and an upstream edge portion, each of the members being formed of a felt of refractory fibers rigidly bonded together, the felt of refractory fibers being compressed to a greater density adjacent the downstream edge portions than the upstream portions of said members;

a metal foil bonded on at least a portion of the outside face of each member; and

means adjacent the upstream portion for spacing the pair of members apart for forming a metal feeding gap between the members and admitting molten metal into such gap for flow towards the downstream edge portions.

**4,303,182**

## DEVICE FOR ELASTICALLY CLAMPING A SLIDING DISCHARGE GATE BY A TORSION BAR

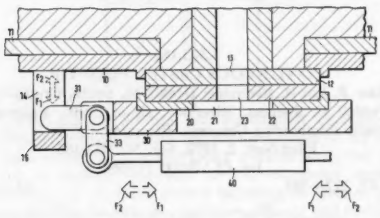
**Enrico Dellepiane; Roberto Ricci, and Giovanni Timossi, all of Genoa, Italy, assignors to Sanac Societa per Azioni Refrattari Argille e Caolini, Italy**

**Filed Dec. 21, 1979, Ser. No. 106,241**

**Claims priority, application Italy, Dec. 22, 1978, 12913 A/78**

**Int. Cl.³ B22D *41/08***

**U.S. Cl. 222—600** **7 Claims**



**1.** A clamping device for the height-wise elastic clamping of a moveable part of a sliding discharge gate of the type which comprises a first, upper fixed plate fixed to the base of a ladle, a second, lower fixed plate having lateral sides and being spaced from the former but by a distance suitable to receive a third, intermediate slidable plate whose position regulates the amount of opening of the discharged gate, in which are provided a clamping device which thrusts the lower fixed plate against the intermediate slidable plate and hence the latter against the upper fixed plate, characterized by said clamping device comprising in sequence:

a pair of shafts rotatably supported by the lateral side of the lower fixed plate,

on the front end of each of said two shafts, a crank arm whose free end is fixed, symmetrically to the other one, to one of the two ends of a floating actuating means for moving said crank arm back and forth,

on the other end of each of said two shafts, cams whose rotation, fixed to the rotation of the two shafts referred to above, causes the lower fixed plate to approach or move away from the upper fixed plate in a direction perpendicular to the planes of said plates, and

wherein said two shafts are dimensioned to exhibit torsional flexibility.

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**4,303,183**

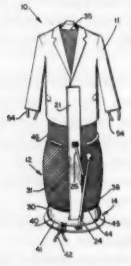
## GARMENT PRESSER

**George Schlemon, 3060 Pharr Ct. NW., Atlanta, Ga. 30305**

**Filed Jan. 24, 1980, Ser. No. 115,100**

**Int. Cl.³ D06F *71/18, 71/40***

**U.S. Cl. 223—67** **10 Claims**



**1.** A garment presser bag assembly comprising an inflatable inner bag of woven nylon material open at its lower end and defining at its upper end a central neck opening and arm openings on opposite sides of said neck opening, an outer bag of expandable net-like material defining a network of openings therethrough, said outer bag also being open at its lower end and inserted over said inner bag and defining at its upper end a central neck opening and arm openings on opposite sides of said neck opening, said inner bag and said outer bag being attached to each other about their neck openings and about their arm openings, said inner bag being of greater breadth than the normal breadth of said outer bag, whereby when a garment is draped over the bag assembly and the inner bag is inflated the inner bag expands to engage the outer bag and the outer bag tends to expand and ride upwardly about said inner bag until the outer bag inflates the garment, whereupon the constraint of the garment against the outer bag retards further expansion of the bag assembly.

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**4,303,184**

## BAG FOR A MOTOR VEHICLE, ESPECIALLY FOR A MOTORCYCLE

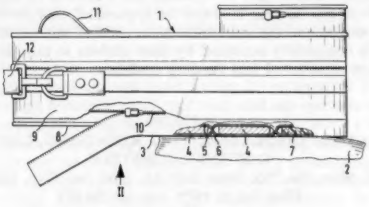
**Wolfgang Kloth, Munich, Fed. Rep. of Germany, assignor to Bayerische Motoren Werke Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Sep. 11, 1979, Ser. No. 74,542**

**Claims priority, application Fed. Rep. of Germany, Sep. 22, 1978, 7828266[U]**

**Int. Cl.³ B62J *9/00***

**U.S. Cl. 224—32 R** **7 Claims**



**1.** In a bag releasably fastenable to parts of a motor vehicle such as a motorcycle, the improvement comprising said bag being provided on at least one side wall with a plurality of holding magnets, wherein said side wall is a two-layered side wall with said plurality of magnets being sewn or sealed between said layers, and wherein said side wall is releasably connected with the bag.

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**4,303,185**

## FRONT OPENING HOLSTER

**Loren R. Shoemaker, 664 Chaparro Rd., Covina, Calif. 91724**

**Filed Sep. 5, 1978, Ser. No. 939,256**

**Int. Cl.³ F41B *13/04***

**U.S. Cl. 224—193** **12 Claims**

**1.** A front opening holster for a handgun having a handle, a muzzle and a trigger guard, including:

means for connection with the user,

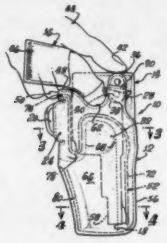
an outer portion for retaining the handgun,

an inner portion for retaining the handgun connected with said means for connection to the user,

a loop connecting said inner portion to said outer portion at their upper rear locations, said loop forming a pivot for the handgun to engage the handgun between the handle thereof and the trigger guard thereof, and

a spring member shaped and stressed to extend along front edge sections of said outer and inner portions of the holster and to lightly bias said outer and inner portions together to permit spread of said front edge sections by the handgun under light outward rotative force, said spring member including an arcuate pivot portion extending through said loop to stiffen the pivot thereby formed

whereby said pivot forms a firm fulcrum for rotation of the handgun thereabout so that the handgun may be re-



moved from said holster by rotating the handle downwardly about said fulcrum to force the muzzle end out of the holster.

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**4,303,186**

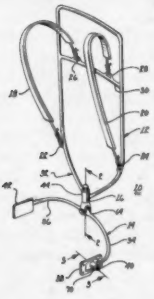
**TRIAXIALLY PIVOTABLE BACKPACK CARRIER**

**Charles G. Ollinger, IV, 912 S. Ninth Ave., Yuma, Ariz. 85364**

**Filed Aug. 11, 1980, Ser. No. 176,983**

**Int. Cl.³ A45F *3/00***

**U.S. Cl. 224—211** **5 Claims**



1. A triaxially pivotable backpack carrier, said carrier comprising in combination:

(a) a backpack frame for supporting various articles to be carried, said backpack frame including shoulder strap harnesses;

(b) a hip yoke having a pair of legs for supportedly engaging a waist harness;

(c) a first pivot member for interconnecting said backpack frame and said hip yoke and for providing pivotal movement therebetween in each of two discretely defined axis, one of the axis being generally vertical and another of the axis being generally horizontal and perpendicular to the major plane of said backpack frame; and

(d) a pair of second pivot members for interconnecting said hip yoke with the waist harness and for providing the freedom of pivotal movement about a third axis, each of said second pivot members being attached to one of the legs of said hip yoke.

**4,303,187**

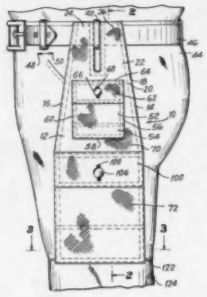
**MULTIPLE POCKET CLOTHING ACCESSORY**

**Charles Berman, 6025 Shore Blvd. South #614, Gulfport, Fla. 33707**

**Filed Jun. 30, 1980, Ser. No. 164,833**

**Int. Cl.³ A45C *11/00***

**U.S. Cl. 224—222** **14 Claims**



1. A multiple pocket clothing accessory comprising

a base panel including

an upper portion,

a lower portion, and

an intermediate portion,

said upper portion being bifurcated to form a pair of spaced apart belt loop portions,

said belt loop portions being disposed on said upper portion of said base panel for the purpose of securing said upper portion to the belt of a user,

said belt loop portions being spaced from one another a distance substantially equal to the width of a belt loop of a pair of trousers worn by said user so as to enable said belt loop portions to be disposed in juxtaposition with respect to said belt loop,

leg band means disposed on said lower portion of said base panel for the purpose of securing said lower portion to the thigh of a user, and

pocket means disposed on said intermediate portion of said base panel.

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**4,303,188**

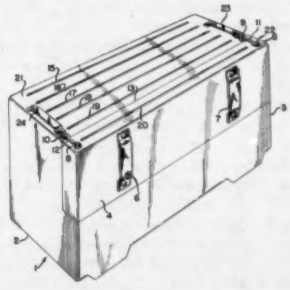
**DRYWALL AND PLASTERING KNIFE CADDY**

**Michael A. Calabrese, 37237 Allen Ave., Cathedral City, Calif. 92234**

**Filed Aug. 11, 1980, Ser. No. 177,106**

**Int. Cl.³ A45C *11/00***

**U.S. Cl. 224—253** **1 Claim**



1. A drywall and plastering knife caddy having a detachable section which comprises:

carrying means, side walls, a top wall and a detachable section; said top wall being provided with a plurality of parallel slots dimensioned to frictionally engage the knife blades and bearing means to secure the detachable section to the caddy; and

said detachable section carrying belt receiving loops.

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**4,303,189**

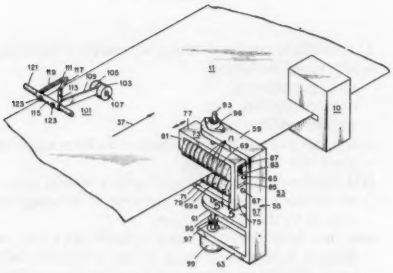
## SYSTEM AND METHOD FOR ALIGNING FABRIC

**Thomas W. Wiley, Asheville, and William R. Joyce, Gerton, both of N.C., assignors to Tex-Fab, Inc., Gerton, N.C.**

**Filed Dec. 27, 1979, Ser. No. 107,533**

**Int. Cl.³ B65H *25/10, 25/26***

**U.S. Cl. 226—15** **9 Claims**



1. A system for aligning a moving run of fabric having longitudinal threads which are aligned in the direction of movement of the run and transversely aligned threads including:

(a) optical means for projecting an image of threads from said fabric onto a fixed target, said optical means enlarging the image of longitudinally aligned threads and the spaces therebetween and suppressing the image of transversely aligned threads,

(b) means for sensing the original position of a selected, longitudinally aligned thread relative to a fixed point on said target,

(c) counting means connected to said sensing means, said counting means being responsive to transverse movement of the fabric relative to said fixed point to count the number of longitudinally aligned threads passing across said fixed point on said target,

(d) means for determining the direction of movement of said selected, longitudinally aligned thread transversely of said fixed point,

(e) guidance means engaging said fabric for moving said fabric transversely across said fixed point,

(f) control means for said guidance means, said control means being adapted to position said guidance means to effect a change in the transverse position of said fabric relative to said fixed point on said target,

(g) means responsive to said counting means and said direction determining means for activating said control means in response to transverse movement of said selected, longitudinally, aligned thread relative to said fixed point on said target to steer said fabric towards a position in which said selected, longitudinally aligned thread is in its original position relative to said fixed point.

**4,303,190**

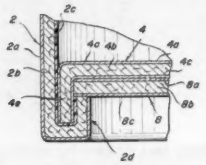
## COMPOSITE END CLOSURE MEMBER FOR COMPOSITE CONTAINERS

**Peter J. Ditto, St. Ann; Donald H. Ellerbrock, Florissant, and Peter G. Pelton, St. Louis, all of Mo., assignors to Boise Cascade Corporation, Boise, Id.**

**Filed Jun. 17, 1980, Ser. No. 160,312**

**Int. Cl.³ B65D *3/14***

**U.S. Cl. 229—5.6** **7 Claims**



1. A composite container, comprising

(a) a tubular cylindrical helically-wound vertically-arranged composite body member (**2**) including at least one fibrous body wall layer (**2***b*), and an inner liner layer (**2***c*);

(b) a cup-shaped composite end closure member (**4**) for closing the lower end of said body member, said closure member including a central fibrous layer (**4***b*), and inner and outer layers (**4***a*, **4***c*) arranged on opposite sides of said central fibrous layer, said end closure member having a central disk-shaped portion (**4***d*) arranged horizontally within, and spaced from the lower extremity of, said body member, and an annular flange portion (**4***e*) extending vertically downwardly from the periphery of said central portion adjacent the inner surface of said body member;

(c) means bonding the outer circumferential surface of said end closure flange portion with the inner surface of said body member; and

(d) a composite reinforcing disk member (**8**) arranged horizontally and in contiguous engagement with substantially the entire lower surface of said end closure central portion, said reinforcing disk member having an upper layer, a central fibrous layer and a lower layer;

(e) the lower extremity of said body member being reversely curled successively inwardly and upwardly about said flange portion to define an annular terminal curled portion (**2***d*) that extends upwardly toward, and terminates in abutting supporting engagement with, the lower surface of said reinforcing disk member, thereby to retain said disk member in reinforcing supporting engagement with the lower surface of said end closure central portion.

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**4,303,191**

## HINGED-LID PACKET FOR CIGARETTES

**Norman Foster, Dibden Purlieu, and Raymond A. Elson, Chandlers Ford, both of England, assignors to British-American Tobacco Company Limited, London, England**

**Filed Oct. 9, 1979, Ser. No. 82,615**

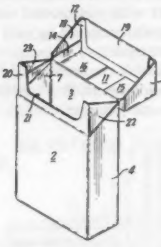
**Claims priority, application United Kingdom, Oct. 16, 1978, 40714/78**

**Int. Cl.³ B65D *5/66***

**U.S. Cl. 229—44 CB** **6 Claims**

1. A hinged-lid packet comprising a body and a lid hingedly attached to the body, said body having a front wall **2**, a rear wall **3** and side walls **4**, **5**, **6**, **7**, and said lid having a front wall **12**, **19** and side walls **17**, **18**, flap means (**22**, **23**) (**22'**, **23'**) of one of said body and said lid, and gripping means (**14**, **18**) (**13**, **17**)

in the other of said body and said lid for receiving said flap means (22, 23) (22', 23'), the gripping means comprising a



portion of first 13, 14 and second 17, 18 sheet material members disposed in face-to-face unsecured relationship.

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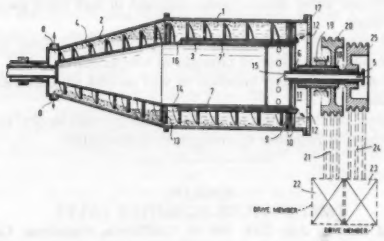
**4,303,192**

## FULL JACKET-WORM CENTRIFUGE

**Hide Katsume, Inage Higashi 3-3-16, Chiba-shi, Chiba-ken, Japan**

**Filed Jun. 17, 1980, Ser. No. 160,215**
**Claims priority, application Japan, Jul. 5, 1979, 54-84439**
**Int. Cl.³ B04B *1/20***
**U.S. Cl. 233—7** **5 Claims**



1. A full jacket-worm centrifuge for continuous separation of water-sludge mixtures, comprising:

an approximately cylindrical drum jacket having a cylindrical section and a conically tapered section with a solid matter discharge at an end thereof, and a worm conveyor having cylindrical and conical portions arranged coaxially therein;

a slurry inlet for the drum jacket at an end wall thereof opposite the solid matter discharge;

a drive means for the drum jacket and worm conveyor;

at least one liquid drainage opening as a liquid separation product discharge arranged in an axial direction between the slurry inlet and the solid matter discharge substantially at a transition from the cylindrical section to the conically tapered section;

at said transition and between said liquid drainage opening and said solid matter discharge a cross-sectional constriction being provided comprising a retarding plate extending radially to a point spaced from an interior side of the drum jacket at said transition;

an exterior opening in the drum jacket and channel means connecting the liquid drainage opening to the exterior opening for conveying liquid thereto in a direction substantially opposite a transport direction of the solid matter and along and adjacent to said worm conveyor;

means for control of at least one of a differential speed between the drum jacket and worm conveyor or solid matter quantity supplied per unit of time to the centrifuge according to at least one of the operating parameters including torque of the worm conveyor, solid matter concentration in the solid matter discharge, or solid matter concentration in the liquid separation product discharge.

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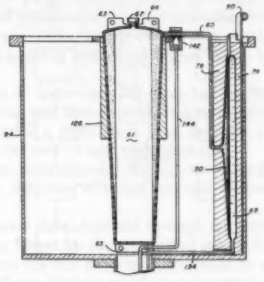
**4,303,193**

## APPARATUS FOR SEPARATING BLOOD INTO COMPONENTS THEREOF

**Allen Latham, Jr., Jamaica Plain, Mass., assignor to Haemonetics Corporation, Braintree, Mass.**

**Filed Jan. 22, 1979, Ser. No. 5,126**
**Int. Cl.³ B04B *9/14***
**U.S. Cl. 233—23 A** **27 Claims**



1. Apparatus for separating blood into a first blood component and a second blood component, comprising, in combination:

a. a self-balancing centrifuge having a rotor capable of rotating at relatively high speeds sufficient to effect the desired separation in a short period of time without significant concomitant vibration, said rotor having a blood processing chamber therein containing a flexible-disposable blood processing bag having inner and outer wall members with a relatively small distance between said inner and said outer wall members compared to other internal bag dimensions, said processing chamber being contoured to support said flexible, disposable blood processing bag in a positon so that the short internal bag dimension is positioned transverse to the axis of rotation whereby second blood component travels along said relatively short internal bag dimension during centrifugal separation thereof;

b. means for introducing blood to be separated into said flexible, disposable blood processing bag;

c. means for rotating said centrifuge rotor at said relatively high rotational speeds to effect separation of said first and said second blood components;

d. a displacement container having a fluid-operated flexible diaphragm, said displacement container being positioned in the processing chamber complementary to said flexible, disposable blood processing bag whereby the fluid-operated diaphragm is positioned to exert pressure on said blood processing bag as fluid is introduced into said displacement container to expel first blood component from the blood processing bag;

e. a receiver container for receiving first blood component expelled from said flexible, disposable blood processing bag, said receiver container being located within said centrifuge rotor and having a geometry which minimizes rotor imbalance as first blood component is introduced therein;

f. blood compatible tubing connecting said blood processing bag to said receiver container; and

g. means for introducing displacer fluid into said displacement container as said centrifuge rotor is rotating thereby providing for the fluid-operated flexible diaphragm to exert pressure on said flexible, disposable blood processing

bag to expel first blood component from said disposable blood processing bag into said receiver container.

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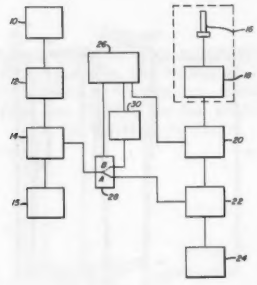
**4,303,194**

## SMOKE PREVENTION APPARATUS

**Fritz Kengle, N. Huntingdon, and James E. Young, Pittsburgh, both of Pa., assignors to U.S. Steel Corporation and Customized Controls, Inc., both of Pittsburgh, Pa.**

**Filed Feb. 28, 1980, Ser. No. 125,725**
**Int. Cl.³ F23N *1/00***
**U.S. Cl. 236—15 E** **4 Claims**



1. In an apparatus for controlling a combustion process, said apparatus including demand signalling means for indicating the amount of heat required in said process, means responsive to said demand signalling means for controlling the flow of one of the components for combustion selected from the group consisting of fuel and air based on said demand, analysis means for determining the proportion of at least one of the components of exhaust gases emitted from said process so as to indicate the conditions of combustion therein, means for determining the ratio of fuel and air to be supplied to said process based at least in part on the proportion of said measured exhaust gas component, and means for controlling the flow of the other of said components for combustion in accordance with the ratio determined by said ratio means,

the improvement in which said apparatus further comprises:

means for determining when the proportion of said exhaust gas component is outside a pre-determined limitation indicating a smoking condition is about to occur in said process, and

emergency control means actuated when the proportion of said exhaust gas component is outside said limitation and deactuated when said component is within said limitation, said control means adjusting the proportion of fuel and air supplied to said process when so actuated so at to prevent smoking.

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**4,303,195**

## THERMALLY RESPONSIVE VALVE DEVICE

**Nobuyuki Hashimoto, and Atsushi Satomoto, both of Toyota, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Sep. 25, 1980, Ser. No. 190,767**
**Int. Cl.³ G05D *23/10***
**U.S. Cl. 236—48 R** **4 Claims**

1. A thermally responsive valve assembly comprising:

a housing;

a first inlet port adapted to be connected to a vacuum source;

a second inlet port adapted to be connected to atmospheric pressure;

a first outlet port adapted to be connected to a first fluid operated device;

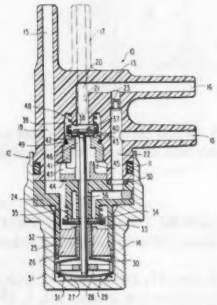
a second outlet port adapted to be connected to a second fluid operated device;

first passage means formed in said housing for connecting said first inlet port with said first outlet port;

second passage means formed in said housing for connecting said first inlet port with said second outlet port;

third passage means for connecting said second inlet port with said first outlet port;

fourth passage means for connecting said second inlet port with said second outlet port, flow restriction means being located in said fourth passage;



first valve means having first and second valves, said first valve being disposed in said first passage means and said second valve means being disposed in said third passage means;

first bimetallic disk means for operating said first valve means in response to changes in temperature;

second valve means disposed in said second passage means; and

second bimetallic disk means for operating said second valve means in response to changes in temperature.

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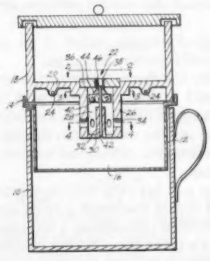
**4,303,196**

## TEMPERATURE SENSITIVE VALVE

**Arnold Raines, Apt. 203, 350 E. California, Pasadena, Calif. 91105, and William August, 1589 Morada Pl., Altadena, Calif. 91001**

**Filed Mar. 24, 1980, Ser. No. 133,554**
**Int. Cl.³ G05D *23/00*; A23F *31/00***
**U.S. Cl. 236—88** **8 Claims**



1. A thermally operated valve comprising a valve body having a fluid passage, a valve seat in the passage, the value seat being made of magnetic material having a predetermined Curie temperature above which the magnetic material is paramagnetic, a movable valve plug including a permanent magnet positioned in the passage, means guiding the plug into and out of engagement with the valve seat for closing and opening the plug, the magnet holding the plug against the valve seat by magnetic attraction at temperatures below the Curie tempera-

ture of the magnetic material and releasing the plug at a temperature above the Curie temperature of the magnetic material.

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**4,303,197**

## CONTROL VALVE

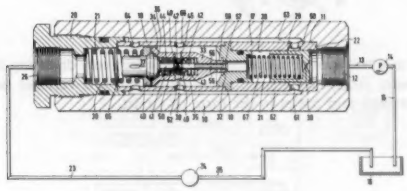
**Hartmut Sandau, Möglingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Jul. 31, 1980, Ser. No. 175,182**

**Claims priority, application Fed. Rep. of Germany, Feb. 20, 1980, 3006370**

**Int. Cl.³ G05D *27/00***

**U.S. Cl. 236—92 R** **4 Claims**



1. A control valve for keeping constant viscosity and temperature of a pressure medium in a hydraulic circuit, comprising a valve housing defining an inlet and an outlet; a control slider arranged for reciprocating movement in said housing; throttling means provided on said slider; a preliminary control valve arranged in said housing downstream of said slider and including a temperature sensitive control element; adjustable throttling means formed between the first mentioned throttling means and said outlet, said adjustable throttling means being controlled by said control element in response to the temperature of the pressure medium; and temperature sensitive safety means provided between said control element and said adjustable throttling means to establish a bypass channel between said inlet and outlet when the temperature of the pressure medium exceeds a predetermined safety limit.

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**4,303,198**

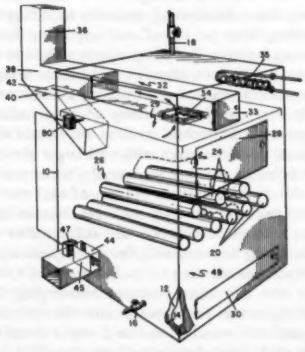
## WOOD-BURNING BOILER

**Robert R. Dulac, 111 Golder Rd., Lewiston, Me. 04240**

**Filed Aug. 11, 1980, Ser. No. 177,011**

**Int. Cl.³ F25D *3/00***

**U.S. Cl. 237—56** **4 Claims**



1. An improved hot water heating system wood boiler comprising:

an inner and outer shell forming a water jacket with four sides and top thereof, the thickness of the top of said water jacket being greater than the thickness of each of the sides of said water jacket;

a base affixed to said water jacket forming a closed combustion chamber;

air entry means disposed at the base of said combustion chamber;

control means to control the air entering said air entry means;

water inlet means located at the base of said water jacket disposed and adapted to have water enter into said water jacket between said inner and outer shells;

water outlet means disposed at the top of said water jacket for providing heated water to the heating system of the structure in which the unit is to be used;

a first set of water-carrying pipes forming a wood grate within said combustion chamber extending from the front of said water jacket to the rear of said water jacket at a slight pitch, being positioned higher at the front than at the rear;

a second set of water-carrying pipes having fewer pipes in number than said first set extending somewhat above said first set and at a slight angle from the front of said water jacket to the rear of said water jacket;

a wood entry door disposed through the front of said water jacket for the entry of wood into said combustion chamber;

an ash removal door disposed through the front bottom of said water jacket for the removal of ash once the wood is burned and the ash particles have fallen to an ash catch chamber formed below said first and second sets of water-carrying pipes above said base;

an air exhaust member passing through a portion of the top of said water jacket having an air entry member positioned at the front of said combustion chamber near the front of said water jacket so that the air must pass through the length of the air exhaust pipe to a chimney means;

a condensate return duct extending from below said chimney into which said air exhaust pipe is interconnected adapted to allow condensates to re-enter the combustion chamber; and

openable means to prevent the exhaust from said combustion chamber from passing back up the condensate return duct and out the chimney.

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**4,303,199**

## RESTORED VIBRATION ISOLATION FOR RAILWAY TRACKS

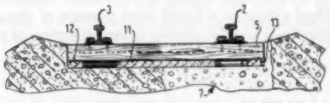
**Jacobus A. Eisses, Haydenlaan 4, 3723 KH Bilthoven, Netherlands**

**Filed Aug. 20, 1979, Ser. No. 67,742**

**Claims priority, application Netherlands, Aug. 22, 1978, 7808659**

**Int. Cl.³ E01B *1/00, 19/00***

**U.S. Cl. 238—2** **11 Claims**



1. The method of restoring the vibration absorbing properties of a compacted railway ballast bed, which comprises the steps of:

(a) locally elevating a section of track and sleepers to provide spaces defined between the bottom supporting surfaces of the sleepers and those surfaces of the compacted ballast which previously supported such sleepers;

(b) inserting two plates of vibration-absorbing material within said spaces beneath each sleeper, the plates supporting only localized areas of the sleeper; and then

(c) lowering the section of track such that it is supported on the compacted ballast only through the medium of said plates;

(d) filling the remainder of the space beneath each sleeper with soft material to inhibit the penetration of ballast beneath the sleepers.

8. A railway track structure which comprises a support such as a bridge, a bed of particulate ballast material on said support and which has become compacted sufficiently as to have lost a significant degree of its initial vibration-absorbing properties, a pair of rails and a plurality of sleepers supporting said rails, resilient means interposed between said sleepers and said compacted bed at least at two localized areas of each sleeper for absorbing vibrations transmitted from said rails sufficiently that the vibration isolation between the track and support initially provided by the ballast bed is restored, and a layer of foamed material filling that space between each sleeper and the ballast bed which is not occupied by said resilient means.

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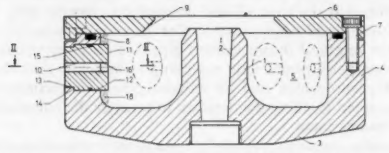
**4,303,200**

## ATOMIZER WHEEL FOR THE ATOMIZATION OF LIQUIDS

**Ove E. Hansen, Vaerlose, Denmark, assignor to A/S Niro Atomizer, Soborg, Denmark**

**Filed Jan. 16, 1980, Ser. No. 112,672**
**Claims priority, application Denmark, Jan. 19, 1979, 252/79**
**Int. Cl.³ B05B *3/10***
**U.S. Cl. 239—223** **3 Claims**



1. An atomizer wheel for the atomization of liquids, comprising: a hub for connection to a rotating drive shaft, a wheel bottom connected to said hub, and a cylindrical side wall connected to said wheel bottom and forming together with the wheel bottom and the hub a bowl-shaped liquid supply chamber, a wheel cover connected to said side wall for upwardly limiting said chamber, an inlet in said wheel cover for liquid to be atomized communicating with the upper part of said liquid-supply chamber, at least one row of ejection orifices for atomizing liquid formed in said side wall, and a protrusion formed at the inner side of the side wall around a leading edge of each ejection orifice relative to the direction of rotation of said wheel for guiding a liquid layer flowing backwardly relative to the side wall around said leading edge and along the surface of the side wall between the ejection orifice and said wheel bottom or wheel cover to a liquid inlet passage of the ejection orifice facing backwardly relative to said direction of rotation.

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**4,303,201**

## SHOWERING SYSTEM

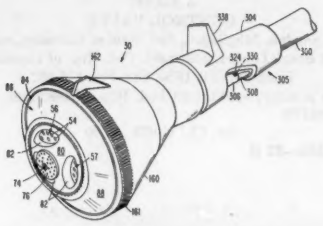
**Christopher W. Elkins; David W. Smith, and John Trenary, all of Ft. Collins, Colo., assignors to Teledyne Industries, Inc., Ft. Collins, Colo.**

**Filed Jan. 7, 1980, Ser. No. 109,882**
**Int. Cl.³ A61H *33/06*; B05B *1/08, 1/30***
**U.S. Cl. 239—383** **57 Claims**

1. In a showering system including a source of hot water and a showerhead fed from said source, a steam producer comprising:

a conduit for delivering water from said source toward said showerhead;

an outlet defined in said conduit;



and means disposed in said conduit for selectively diverting the water from said source away from said showerhead and through said outlet in the form of a mist.

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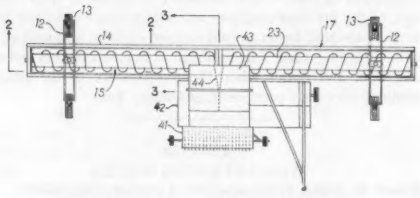
**4,303,202**

## STRAW DISTRIBUTING APPARATUS

**Norris E. Hanford, Box 1283, Fort Benton, Mont. 59442**

**Filed Dec. 10, 1979, Ser. No. 101,884**
**Int. Cl.³ A01C *15/00***
**U.S. Cl. 239—664** **17 Claims**



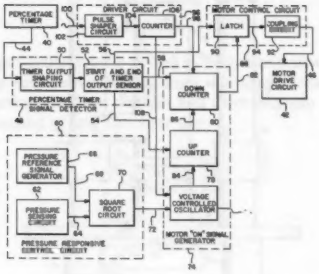
1. Apparatus for distributing chopped straw substantially uniformly including a wheeled carriage, a supporting frame disposed on said wheeled carriage, and a straw distributing assembly, said straw distributing assembly including a trough section extending from one side of said supporting frame to the other, said trough section including panels affixed to said supporting frame, the bottom edges of said panels being spaced from one another to form a slot opening therebetween, said straw distributing assembly including an auger member disposed in a generally horizontal position above said slot opening, a roll member cooperative with said auger member, said roll member being disposed in a generally horizontal position below said slot opening with a portion of said roll member extending into said slot opening, said roll member having an outer surface with protuberances, said roll member and said auger member being disposed with their axes generally parallel and their peripheries adjacent to each other, said axes of said roll member and said auger member converging from the straw receiving end to the opposite end thereof, said outer surfaces of said roll member and said auger member being spaced from each other between about one-third and two-thirds the diameter of said roll member at the straw receiving end, and drive means for rotating said auger member and said roll member in the same direction and at coordinated speeds of rotation.

4,303,203

## CENTER PIVOT IRRIGATION SYSTEM HAVING A PRESSURE SENSITIVE DRIVE APPARATUS

Robert W. Avery, 4650 SW. 145th St., Apt. 62, Beaverton, Oreg. 97005

Filed Aug. 30, 1979, Ser. No. 71,073
Int. Cl.[3] A01G *27/00;* B05B *3/00*
U.S. Cl. 239—710 29 Claims




1. A drive motor control apparatus for a center pivot irrigation line having plural towers, a drive motor at a lead one of such towers and a timer for periodically transmitting a control signal to the drive motor, the drive motor being energized in response to the control signal so as to move the line about its pivot for the duration of the control signal, comprising:

means for interrupting the transmission of the control signal from the timer to the drive motor at the lead tower;

control signal generator means for generating a replacement control signal of a duration which varies with variations in the magnitude of pressure in the line at a preselected location;

means for transmitting said replacement control signal to the drive motor so that the drive motor moves the line about its pivot for the duration of the replacement control signal.

9. A drive apparatus for moving a lead tower of a center pivot irrigation line and thereby follower towers and the line about its pivot whose relative elevation is zero comprising:

drive means for moving the lead tower about the pivot;

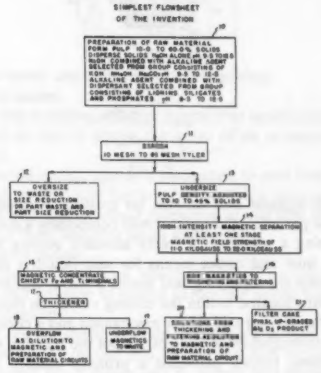
control means for controlling said drive means, said control means being responsive to the magnitude of water pressure sensed in the line at a location spaced from the pivot relative to the magnitude of a predetermined reference water pressure the magnitude of water pressure at such spaced location being lower when the spaced location is at an elevation higher than the elevation of the pivot and higher when the spaced location is at an elevation lower than the elevation of the pivot, said control means controlling said drive means to move the lead tower about the pivot at a slower rate of travel when the spaced location is at a higher elevation relative to the elevation of the pivot and for moving the lead tower about the pivot at a faster rate of travel when the spaced location is at a lower elevation relative to the elevation of the pivot.

4,303,204

## UPGRADING OF BAUXITES, BAUXITIC CLAYS, AND ALUMINUM MINERAL BEARING CLAYS

David Weston, Toronto, Canada, assignor to Reynolds Metals Company, Richmond, Va.

Continuation-in-part of Ser. No. 14,279, Feb. 23, 1979, Pat. No. 4,272,029, and Ser. No. 115,397, Jan. 25, 1980, Pat. No. 4,227,446, which is a continuation-in-part of Ser. No. 6,111, Jan. 24, 1979, each is a continuation-in-part of Ser. No. 838,445, Oct. 4, 1977, Pat. No. 4,193,971, which is a continuation-in-part of Ser. No. 736,446, Oct. 28, 1976, Pat. No. 4,113,466. This application Oct. 27, 1980, Ser. No. 201,279
The portion of the term of this patent subsequent to Jun. 9, 1998, has been disclaimed.
Int. Cl.[3] B02C *23/08;* B03B *1/04*
U.S. Cl. 241—16 40 Claims


SIMPLEST FLOWSHEET OF THE INVENTION
PREPARATION OF RAW MATERIAL
SCREEN
OVERSIZE TO WASTE OR SIZE REDUCTION OR PART WASTE AND PART SIZE REDUCTION
UNDERSIZE PULP DENSITY ADJUSTED TO 10 TO 45% SOLIDS
HIGH INTENSITY MAGNETIC SEPARATION AT LEAST ONE STAGE
MAGNETIC CONCENTRATE CONSTITUTES
HIGH MAGNETICS TO
THICKENER
OVERFLOW AS DILUTION TO MAGNETIC AND PREPARATION OF RAW MATERIAL CIRCUITS
UNDERFLOW MAGNETICS TO WASTE
SOLUTIONS FROM THICKENING AND FILTERING RECYCLED TO MAGNETIC AND PREPARATION OF RAW MATERIAL CIRCUIT
FILTER CAKE FINAL UP- GRADED PRODUCT

1. A process for the upgrading of an aluminum mineral bearing material selected from the group consisting of bauxites, bauxitic clays, and aluminum mineral bearing clays comprising:

(a) subjecting a pulp of the said material to at least one dispersion stage in the presence of at least sodium hydroxide in combination with a dispersant selected from the group consisting of lignins, silicates, phosphates, and mixtures thereof, and in the pH range of about 8.5 to 12.5;

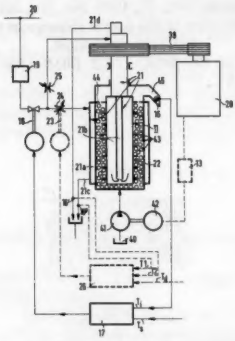
(b) subsequently subjecting the said pulp to at least one screening stage in the range of 20 mesh Tyler to 65 mesh Tyler to produce a minus 20 to minus 65 mesh screened product, wherein the screen size used in said screening stage is a direct function of the width of the magnetic gap of a high intensity magnetic separation apparatus used in a subsequent at least one stage of high intensity magnetic separation; and wherein such screen size is at least 10% less in dimension than the width of the said magnetic gap setting in the subsequent at least one stage of high intensity magnetic separation; and

(c) subsequently subjecting the said minus 20 to minus 65 mesh screened product to at least one stage of high intensity magnetic separation using a field strength of about 11.0 to 22.0 kilogauss and a magnetic gap setting in the range of about 0.35 to 2.0 millimeters, with a maximum retention time of less than about 10 seconds to produce a magnetic concentrate enriched in iron and titanium minerals and a nonmagnetic product impoverished in iron and titanium minerals.

## 4,303,205
## AGITATOR MILL AND METHOD OF CONTROLLING THE SAME

Armin Geiger, Bichwil, and Kurt Grauer, Degersheim, both of Switzerland, assignors to Gebruder Buhler AG, Switzerland

Filed Aug. 22, 1979, Ser. No. 68,852
Claims priority, application Switzerland, Aug. 24, 1978, 8992/78; May 3, 1979, 4169/79
Int. Cl.³ B02C 17/16
U.S. Cl. 241—17 31 Claims



1. An agitator mill suitable for treating a liquid including material particles, the agitator mill comprising a milling vessel containing a plurality of freely movable milling bodies and having inlet and outlet means for said liquid, a controllable feed pump for supplying said liquid, a stirrer mechanism having a rotor located within the milling vessel, an electric stirrer motor for driving said stirrer mechanism and a cooling system for the throughflow of coolant to cool the liquid in said vessel, there being further provided a primary control circuit for controlling the stirrer motor current, said primary control circuit including means for comparing the actual value of said stirrer motor current with a desired value thereof and means for adjusting at least one of the speed of the feed pump and the number of milling bodies within the working volume of the milling vessel, whereby to readjust said actual value of the current to a value substantially equal to said desired value thereof, and a secondary control circuit for controlling the temperature of the liquid in the milling vessel, said secondary control circuit including a temperature controller for comparing the actual temperature of the liquid in the milling vessel with a desired temperature thereof and for adjusting said cooling system to increase the cooling when too high an actual temperature is present and to decrease the cooling when two low an actual temperature is present.

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## 4,303,206
## DEBONING METHOD AND APPARATUS

Jack A. Prince, Gainesville; L. Wayne Abernathy, Lula, and L. Justin Caylor, Dalton, all of Ga., assignors to Jack Prince, Inc., Gainesville, Ga.

Filed Sep. 6, 1979, Ser. No. 72,888
Int. Cl.³ B02C 23/16
U.S. Cl. 241—24 23 Claims

1. In a deboning machine for separating mixed particles of bone and meat product such as obtained by grinding fish or chicken bones having meat thereon:

a machine frame,

a support base for said frame,

a motor mounted on said support base,

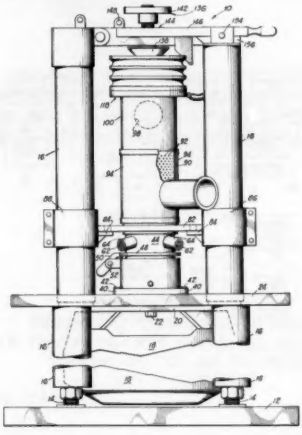
a product auger having a first end and an opposed second end, said first end being connected directly to said motor for directing the product toward said motor,

connecting means on said base connecting said motor directly to said auger,

said auger being tapered on the outside and comprising auger blades therein for removing meat products and directing same toward said motor,

support means on the base for supporting said auger for rotation by said motor, said support means comprising first bearing means for said auger on said support base,

a housing mounted on said base and having said auger mounted therein and there being a product space between the inside of said housing and the exterior of said auger near the second end thereof,



a bone outlet adjacent said first bearing means and in communication with the space between said housing and said auger,

a sleeve having holes therein mounted over said auger,

a meat outlet adjacent said first bearing means in communication with said sleeve,

a product inlet mounted on said machine adjacent said second end of said auger and being in communication with said auger,

support members supporting said sleeve on said base outside said sleeve,

second bearing means for the second end of said auger,

and means on said support members for retaining said second bearing means in position on the second end of said auger.

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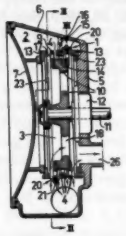
## 4,303,207
## SCREENING APPARATUS

Alf I. Lindström, Sundsbruk, Sweden, assignor to Sunds Defibrator Aktiebolag, Sweden

Filed Feb. 15, 1980, Ser. No. 121,924
Claims priority, application Sweden, Feb. 20, 1979, 7901473
Int. Cl.³ B02C 7/02; B07B 1/08
U.S. Cl. 241—261.2 16 Claims

1. Screening apparatus for fractionating pulp suspensions under pressure, comprising a closed housing; a first member positioned in said housing; a second member positioned in said housing on one side of said first member and arranged coaxially with and parallel to said first member, said second member being rotatable relative to said first member and cooperating therewith to form an open circumferential screening gap between adjacent outer peripheral edges of said first and second member; a supply chamber located in said housing radially outwardly of said screening gap and communicating therewith; a collecting chamber located in said housing radially inwardly of said screening gap and communicating therewith; and defibrating means for defibrating coarse suspension materials passing from said supply chamber to said collecting cham-

ber through said screening gap, said defibrating means including at least one projection extending into said screening gap from one of said first and second members, whereby said at



least one projection rejects as well as defibrates coarse materials in pulp suspensions passing from said supply chamber to said collecting chamber through said screening gap so as to inhibit clogging of said screening gap.

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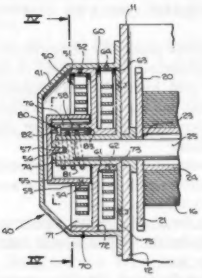
**4,303,208**

## FRICTION CLUTCH OPERATED REDUCED TENSION SAFETY RETRACTION MEANS

**Akira Tanaka, Northridge, Calif., assignor to American Safety Equipment Corp., Troy, Mich.**

**Continuation-in-part of Ser. No. 680,111, Apr. 26, 1976, Pat. No. 4,026,494, and Ser. No. 701,504, Jul. 1, 1976, Pat. No. 4,113,200.**
**This application Oct. 18, 1976, Ser. No. 733,356**
**Int. Cl.[3] A62B *35/02;* B65H *75/48***
**U.S. Cl. 242—107** **13 Claims**



1. A safety belt retractor having a safety belt wound upon a spool rotatably journaled in a retractor frame comprising:

first biasing means for biasing said spool in a belt rewind direction and second biasing means for biasing said first biasing means in a manner to cause said first biasing means to maintain its bias on said spool during full belt retraction;

friction clutch means interconnected between said second biasing means and said frame for selectively blocking out the bias of said second biasing means; and

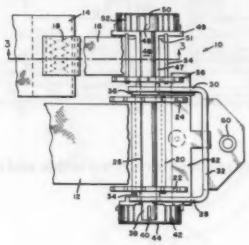
actuator means connected to said spool and engageable with said friction clutch means for operating said clutch means to selectively block and unblock the bias of said second biasing means upon said first biasing means in response to rotation of said spool in a predetermined manner.

**4,303,209**

## TENSION REDUCER FOR DUAL SPOOL RETRACTOR

**Robert L. Stephenson, Utica, Mich., assignor to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed May 14, 1980, Ser. No. 149,616**
**Int. Cl.[3] A62B *35/02;* B65H *75/48***
**U.S. Cl. 242—107.4 A** **14 Claims**



1. A dual spool seat belt retractor comprising:

first spool means;

first seat belt webbing attached to said first spool means and adapted to extend across the torso of an occupant of a vehicle;

a first rewind spring operably connected to said first spool means to rewind said first seat belt webbing onto said first spool means and to permit extraction of said first seat belt webbing from said first spool means;

second spool means;

second seat belt webbing attached to said second spool means and adapted to extend across the pelvic region of said occupant;

a second rewind spring operably connected to said second spool means to rewind said second seat belt webbing on said second spool means and to permit said second seat belt webbing to be extracted from said second spool means; and

tension reducing means operable to reduce the rewind force of said first rewind spring acting on the torso of said occupant through said first seat belt webbing, said tension reducing means comprising:

connecting means connecting said first and second rewind springs, said connecting means being operable to unwind said first spring means and thereby reduce its rewind force upon tightening of said second rewind spring in response to extraction of said second seat belt webbing from said second spool means.

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**4,303,210**

## TAPE DRIVE DEVICE

**Masahiko Fujita, Yokohama; Kenji Hayashi, Kamakura, and Kazutoshi Konno, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

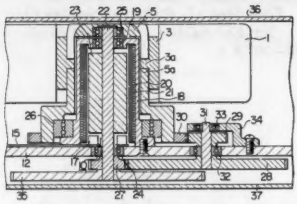
**Filed Dec. 7, 1979, Ser. No. 101,270**
**Claims priority, application Japan, Dec. 13, 1978, 53-153154; Nov. 30, 1979, 54-154383**
**Int. Cl.[3] G03B *1/04;* G11B *15/32***
**U.S. Cl. 242—200** **11 Claims**

1. A tape drive device including a reel hub for supplying or taking up a tape-shaped information recording and reproducing medium such as a magnetic tape or a film, said device comprising, at least:

(a) a reel hub formed with a cavity thereinside;

(b) a motor received at least partly within said cavity formed in said reel hub, said motor including a rotor unit and a stator unit; and

(c) coupling means comprising a reduction gearing for transmitting to said reel hub the rotating force generated by the



rotor unit of said motor received within said cavity of said reel hub.

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**4,303,211**

**RADIO SYSTEMS AND APPARATUS**

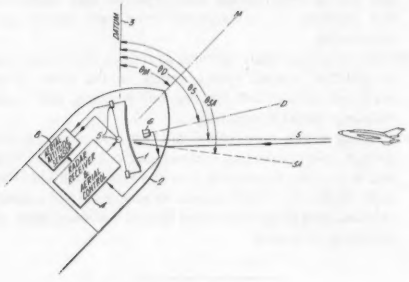
**Graham C. Dooley, Tring, and Alistair J. Dunlop, London, both of England, assignors to The Marconi Company Limited, England**

**Filed Jun. 4, 1976, Ser. No. 694,011**

**Claims priority, application United Kingdom, Jun. 4, 1975, 24177/75**

**Int. Cl.³ F41G *7/00*; F42B *15/02*; G06F *15/50***

**U.S. Cl. 244—3.19** **8 Claims**



1. A radome aberration correction system having a directional aerial system and a radome enclosing said aerial system, the aberration correcting system comprising:

(A) an addressable digital data store storing predetermined information in respect of the direction-aberration imposed on radio waves received by said aerial system from different apparent directions so that predetermined aberration information is stored in association with different apparent directions,

(B) means for detecting the apparent direction of a source of radio waves received by said aerial system,

(C) means for addressing said data store with an address characteristic of said apparent direction to determine from the data store a predetermined stored value of direction-aberration associated with said apparent direction, and

(D) means for adding said value of direction-aberration to said apparent direction to give the true direction of said source.

**4,303,212**

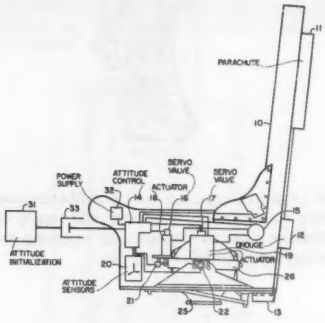
**VERTICAL SEEKING AIRCREW ESCAPE SYSTEM**

**W. James Stone, and Ronald G. Stoutmeyer, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 26, 1979, Ser. No. 33,590**

**Int. Cl.³ B64D *25/10***

**U.S. Cl. 244—122 AD** **1 Claim**




1. A vertical seeking aircraft ejection seat comprising:

a seat frame;

a two axis gimbal system having a pitch axis gimbal and a roll axis gimbal attached to said seat frame;

a spherical rocket motor for producing thrust mounted on said two axis gimbal system;

a three axis rate gyro system for sensing the attitude of said aircraft ejection seat connected to said seat frame;

a hydraulic accumulator including a predetermined quantity of hydraulic fluid attached to said seat frame;

a power supply attached to said seat frame;

a first and a second servo valve connected to said hudraulic accumulator for receiving said pressurized hydraulic fluid;

at least two hydraulic actuators connected respectively between said servo valves and the pitch and roll axes of said two axis gimbal system for controlling said motor means;

an attitude control processor comprising a digital microprocessor connected between said three axis rate gyro system and said hydraulic accumulator for receiving attitude inputs and directing said accumulator;

an attitude control signal compensator connected to said microprocessor;

an actuator loop compensator connected between said attitude control signal compensator and said first and second servo valves;

a first position feedback circuit connected between said pitch axis hydraulic actuator and said actuator loop compensator; and

a second position feedback circuit connected between said roll axis hydraulic actuator and said actuator loop compensator; and

an attitude initialization circuit for providing a set of initial conditions to said microprocessor upon seat ejection.

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**4,303,213**

**TOW PLATE**

**John W. Bolender, Seattle, and Gerald C. Simmons, Bothell, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Feb. 21, 1979, Ser. No. 13,755**

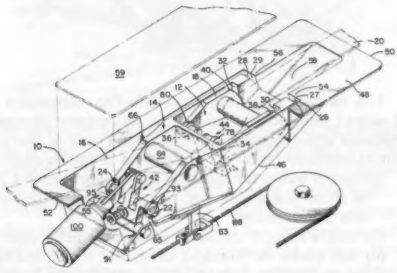
**Int. Cl.³ B64D *1/12, 17/38***

**U.S. Cl. 244—137 R** **12 Claims**

1. A tow plate for use in an aerial cargo delivery system wherein an object is extracted from a moving aircraft by a drag

force exerted by extraction means deployed rearwardly therefrom, said tow plate comprising: a clevis assembly connectable between the object and the extraction means and a retention assembly for selectively retaining said clevis assembly to transmit the drag force to the aircraft and releasing said clevis assembly to transmit the drag force to the object;

said clevis assembly including a main clevis member connectable to the object and having a front end and a rear end, a drogue clevis member connectable to the extraction means and having a front end and a rear end, remotely actuatable latch means acting between said main clevis member and said drogue clevis member for selectively securing and releasing said front end of said drogue clevis member and said main clevis member, said latch means include a latching mechanism having roller means engagable with said front end of said drogue clevis member in overlying relation therewith in a retention position and backstop means operatively connected with said main



clevis member for retaining said rear end of said drogue clevis member while said front end of said drogue clevis member is secured;

said retention assembly including means for selectively securing and releasing the front end of said main clevis member, means for selectively actuating said latch means and backup means for interconnecting said securing means and said actuating means, said actuating means being capable of moving said roller means toward a release position disengaged from said front end of said drogue clevis member;

said latch means and said backstop means permitting said drogue clevis member to rotate in a rearward direction about said rear end of said drogue clevis member toward a jettisoned position separated from said main clevis member when said front end of said drogue clevis member is released, whereby said extraction means may be jettisoned.

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**4,303,214**

## APPARATUS FOR GYROSCOPIC EJECTION OF SHUTTLE LAUNCHED SPACECRAFT

**Alois Wittmann, Rancho Palos Verde, and Charles P. Rubin, Santa Monica, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.**

**Filed May 30, 1978, Ser. No. 910,321**
**Int. Cl.³ B64G *1/14, 1/22***
**U.S. Cl. 244—158 R** **3 Claims**

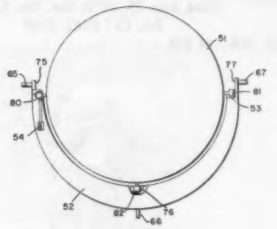
1. An apparatus for gyroscopic ejection of a spacecraft having first and second trunnions on opposite sides thereof, said apparatus comprising:

a U-shaped cradle having first and second mating surfaces on opposite sides thereof for mating with said first and second spacecraft trunnions respectively;

locking means for normally restraining said first trunnion against movement away from said first mating surface but for selectively releasing said first trunnion so as to allow movement thereof towards the open end of said U-shaped cradle;

means for applying a force to said first trunnion, which force is directed towards the open end of said U-shaped cradle; and

said second mating surface comprises a slot formed in the side of said cradle, said second trunnion has a ball shaped outer end and a swivel block which is adapted for insertion into said slot and which is fastened to said ball shaped portion of said second trunnion so as to be free to move thereon;



whereby when said first trunnion is released by said locking means, a spacecraft which is mounted by said trunnions to said cradle rotates about said ball shaped portion of said second trunnion so as to produce translatory and rotary movement of said spacecraft as it is ejected from said cradle.

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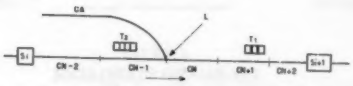
**4,303,215**

## DEVICE FOR CONTROLLING THE STOPPING OF A TRAIN

**Alaine Maire, 4, Impasse de Toulouse, Versailles (Les Yvelines), France**

**Filed Jul. 30, 1979, Ser. No. 61,647**
**Int. Cl.³ B61L *3/24***
**U.S. Cl. 246—182 B** **2 Claims**



1. Installation for controlling the stopping of trains with ground equipment and equipment fitted on board each train, the ground equipment comprising conductor loops which define cross-overs, these cross-overs being allocated on the one hand, according to a normal program **P1*n*** and, on the other hand, according to an interference program **P2*n*** associated with each block **C*n*** of the series n, each loop being traversed by a signal **FS*n*, PP*n*** formed by the ground equipment, said installation being characterised in that the ground equipment associated with each block comprises a frequency generator **GF** generating a normal mode frequency **F1**, an interference mode frequency **F2** and a carrier frequency **F3** to be modulated, supplying a mode selector SM, which is connected to an amplifier AM, with a frequency signal F3 modulated by a normal signal **F1**, or by an interference signal **F2**, so as to provide a frequency signal **FS*n*** as a function of an occupation signal OCC (n+1) received by the mode selector SM and corresponding to the occupation of the following block **C*n*+1**, as well as a frequency signal **PP*n*** enabling the interference program **P2*n*** to be read, and the equipment fitted on board each train comprises a logical emergency-braking circuit CLF supplying an emergency-braking signal **F*n***, as a function of the signals **FS*n*** and **PP*n*** detected by its aerial AN, this logical circuit CLF detecting both the signal **FS*n*** and signal **PP*n*** for actuating the priority control over the signal **PP*n*** defining the

interference program when this circuit detects a signal FS*n* corresponding to the interference mode.

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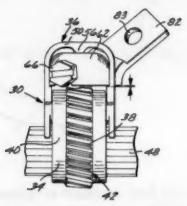
**4,303,216**
**RELEASABLE CLAMP ASSEMBLY**
**Robert A. Hollingsead, La Habra, Calif., assignor to Hollingsead International, Inc., Santa Fe Springs, Calif.**
**Filed Jun. 25, 1979, Ser. No. 52,012**
**Int. Cl.³ F16L *3/08***
**U.S. Cl. 248—74 PB** **44 Claims**



1. A retainer assembly for holding objects such as wire and the like comprising;
a strap member having a plurality of locking elements;
a housing member removably and separably connected to the strap member;
means for connecting the housing member to a support member;
fastening means operatively connected to the housing member for engagement with the locking elements to adjust the relative position of the strap member about the object, and
means for releasing the fastening means from engagement with the locking elements at a predetermined force load.

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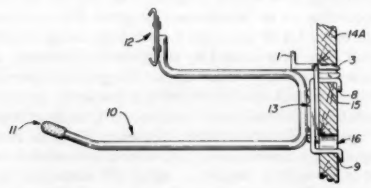
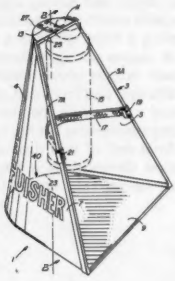
**4,303,217**
**PEGBOARD STABILIZER**
**Benjamin L. Garfinkle, Alameda, Calif., assignor to Clamp Swing Pricing Co., Alameda, Calif.**
**Filed Oct. 29, 1979, Ser. No. 89,034**
**Int. Cl.³ E04G *5/06***
**U.S. Cl. 248—221.1** **8 Claims**



1. A stabilizer for use with pegboard hangers of the type having a hook back plate, said stabilizer comprising a body section capable of contacting one surface of said back plate, a first protrusion perpendicular to said body section of such size and shape to snugly fit into a pegboard hole together with a hook member of said back plate, and a second protrusion perpendicular and on the opposite side of the body section as the first protrusion to snugly fit in a receiving hole in the back plate.

**4,303,218**
**PORTABLE FIRE EXTINGUISHER SUPPORT**
**Carl F. Naegeli, 5230 E. Osborn, Phoenix, Ariz. 85018**
**Filed Jun. 23, 1980, Ser. No. 161,777**
**Int. Cl.³ A47G *23/02***
**U.S. Cl. 248—146** **13 Claims**



1. A rack for supporting a portable fire extinguisher having a support element attached thereto, said support element being disposed approximately at the level of a neck of said portable fire extinguisher, said rack comprising in combination:
(a) hanger means for engaging said support element in order to allow hanging of said portable fire extinguisher from said hanger means;
(b) hanger support means for supporting said hanger means;
(c) wall means for bounding an interior region and supporting said hanger support means whereby the body of said portable fire extinguisher hangs into said interior region, said wall means having an open front exposing said interior region and said portable fire extinguisher hanging therein so that said portable fire extinguisher can be easily grasped and lifted out of said interior region, said wall means having an upper edge and a lower edge, said hanger support means being supported at said upper edge by said wall means; and
(d) retaining means disposed in said interior region for retaining the body of said hanging portable fire extinguisher in a position such that the center of mass of said fire extinguisher is positioned approximately directly over the geometrical center of an area subtended by said wall means, wherein said retaining means includes a retaining strap having a first end affixed to a first front edge of said wall means and a second end attached to a second front edge of said wall means, said retaining means passing behind said hanging fire extinguisher to maintain it in a position such that its center of mass is approximately directly over the geometrical center of the area subtended by said wall means whereby maximum stability of said portable rack and said fire extinguisher supported thereby is achieved.

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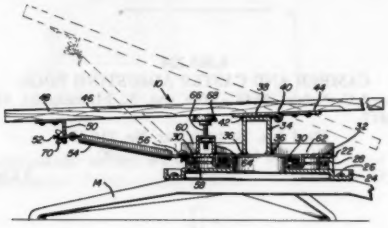
**4,303,219**
**SWIVEL-ROCKER BASE**
**Virgil P. Carrick, P.O. Box 867, High Point, N.C. 27261**
**Filed Dec. 14, 1979, Ser. No. 104,026**
**Int. Cl.³ A47C *3/02***
**U.S. Cl. 248—425** **4 Claims**

1. A rocker support assembly for swivel and rocking support of a seat structure, said assembly including a roller member for anchoring atop a stationary base, an upper member disposed over and rotatably supported from said lower member for angular displacement relative thereto about an upstanding axis, said upper member including first front and rear portions disposed forward and rearward, respectively, of said axis, a seat support means mounted on and projecting upwardly from said upper member, a seat support member including second

front and rear portions overlying said first front and rear portions, pivotally attached to said mount for oscillation about a horizontal transverse axis adjacent said upstanding axis and extending forwardly and rearwardly of said transverse axis, said seat support member being adapted to support a seat therefrom with front and rear portions of said seat overlying said second front and rear portions, expansion spring means connected and extending between said first and second front portions yieldingly resisting upward movement of said second front portion relative to said first front portion, vertically



adjustable upwardly facing abutment structure carried by said first front portion and abuttingly engageable by said second front portion to limit downward swinging of the latter relative to said first front portion, said expansion spring means comprising a plurality of elongated inclined coiled expansion springs having their lower ends anchored to said first front portion and their upper ends anchored to said second front portion, said expansion springs being forwardly and upwardly inclined when said second portion is downwardly abutted against said abutment structure.

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**4,303,220**

## FOUNDATION FOR A VIBRATING MACHINE

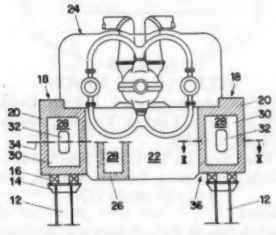
**Hubert Gallasch, Mannheim, Fed. Rep. of Germany, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland**

**Filed Mar. 28, 1980, Ser. No. 135,109**

**Claims priority, application Fed. Rep. of Germany, Apr. 9, 1979, 2914251**

**Int. Cl.³ F16M** *1/00, 3/00, 5/00, 9/00*

**U.S. Cl. 248—679** **9 Claims**



1. A foundation for a vibrating machine, comprising:

a frame-like stage plate which includes girders and beams, said beams extending transversely with respect to said girders;

each of said girders and beams having a hollow interior, and each of said girders and beams having a moment of inertia relative to a bending axis which is at least three times the moment of inertia required for said stage plate to support a given load.

**4,303,221**

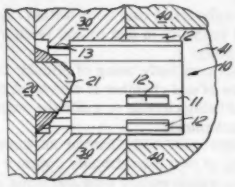
## CORE PIN FOR MAKING A PLASTIC CONNECTOR SHELL HAVING AN INTERNAL KEYWAY

**David O. Gallusser, Oneonta; Valentine J. Hemmer, Sidney; Gary C. Toombs, Oneonta, and Robert W. Brush, Unadilla, all of N.Y., assignors to The Bendix Corporation, Southfield, Mich.**

**Filed Nov. 14, 1980, Ser. No. 206,768**

**Int. Cl.³ B29C** *1/00;* **B29F** *1/06*

**U.S. Cl. 249—102** **9 Claims**



1. A core pin for use with a mold for making a plastic connector shell having at least two keyways, said core pin comprising:

a plurality of arcuate segments arranged to form a cylindrical body; and

a radical projection along the outer surface of at least two of said segments whereby each rearrangement of said segments having said projection results in a different outer configuration of said cylindrical body, said radial projection extending an axial distance along said surface.

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**4,303,222**

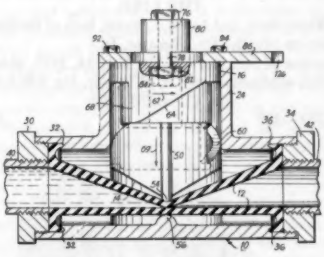
## PINCH VALVE

**James A. Campbell, Monroeville, Pa., assignor to Red Valve Company, Inc., Carnegie, Pa.**

**Filed Feb. 6, 1980, Ser. No. 118,921**

**Int. Cl.³ F16K** *7/06*

**U.S. Cl. 251—7** **6 Claims**



1. A pinch valve comprising:

(A) a hollow valve body having:

(i) an inlet opening for fluid ingress; and

(ii) an outlet opening for fluid egress;

(B) a flexible resilient sleeve extending between the openings in the valve body, so that a fluid stream flowing through the pinch valve flows successively through the inlet opening, the sleeve and the outlet opening;

(C) an extension of the valve body, said extension being substantially perpendicular to the sleeve and having a chamber in commmunication with the sleeve;

(D) an inner cam body within the chamber, said inner cam body being located with the sleeve on its inner end and having:

(i) a cam surface at its outer end consisting of two diamet-

rically opposed cut-out portions of the inner cam body, each of said portions having identical cam surfaces; and

(ii) two diametrically opposed rectilinear ribs on opposite sides of said inner cam body, each rib being perpendicular to the valve sleeve;

(E) the inside surface of the chamber having two diametrically opposed rectilinear grooves, each of said grooves being perpendicular to the valve sleeve;

(F) the ribs being slidable in the grooves to constitute means to guide the inner cam body for non-rotational translational movement in a direcction towards and away from the sleeve;

(G) an outer cylindrical cam body within said chamber and juxtaposed coaxially in end to end relationship with said inner cam body:

(i) said outer cam body being of circular cross-section;

(ii) a portion of said chamber at which the outer cam body is located being circular to guide the outer cam body for rotary movement;

(iii) the outer cam body having an inner cam surface consisting of two diametrically opposed identical camming ramps each mating with and being in contact with a different one of said cut-out portions of the inner cam body;

(iv) such that rotation of said outer cam body in one certain direction cams said inner cam body inwards and against said sleeve whereby the inner end of said inner cam body pinches said sleeve and opposite rotation of said outer cam body permits the sleeve to expand;

(H) means to rotate said outer cam body;

(I) a transverse integral ridge at the botton of the valve body; and

(J) a linear rib at the bottom of the inner cam body and connecting the lower ends of the opposed rectilinear ribs, said linear rib being registered with the transverse integral ridge;

(K) said ridge and rib cooperating between them to serve to pinch the sleeve when the outer cam body is rotated in said one certain direction to cam the inner cam body inwards towards the sleeve.

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**4,303,223**

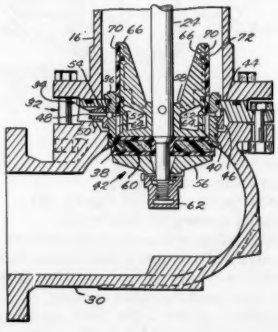
## VALVE FACING FOR SLIDING VALVE ELEMENTS OR THE LIKE

**Fred S. Whisenhunt, and Lloyd J. Street, both of Bethesda, Md., assignors to Mueller Co., Decatur, Ill.**

**Continuation of Ser. No. 768,436, Feb. 14, 1977, abandoned. This application Aug. 3, 1978, Ser. No. 930,676**

**Int. Cl.³ E03B 9/02**

**U.S. Cl. 251—357** **25 Claims**



1. In a valve assembly subject to liquid under high pressures, said valve assembly having valve members including a valve seat and a valve element which is slidably movable relative to the valve seat to open and close the valve assembly and a resilient and deformable valve facing on one of the said valve members whereby the valve facing contacts the other valve member when the valve assembly is closed to tightly wedge and seal the closed valve assembly against liquid leakage,

the improvement wherein the valve facing comprises a resilient and deformable foamed polymeric core and an impervious, abrasion resistant solid polymeric outer surface which overlays the foamed core at every point where the valve facing contacts the other valve member and the ratio of the thickness of the foamed core to the thickness of the outer surface is about 0.5:1 up to about 5:1.

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**4,303,224**

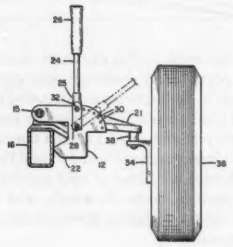
## CAMBER AND CASTER ADJUSTING TOOL

**Leonard G. Nelson, 5644 - 40th Ave. S., Minneapolis, Minn. 55417**

**Filed Jan. 29, 1980, Ser. No. 116,454**

**Int. Cl.³ B66F 1/00, 15/00**

**U.S. Cl. 254—131** **5 Claims**



1. Apparatus for facilitating the adjustment of camber and caster of a vehicle wheel said vehicle being of the type having a pivot bar adjustable relative to the vehicle frame and means coupling said pivot bar to said wheel, comprising:

(a) a generally flat head member having first aperature means for securing a portion of said head member to said pivot bar, said head member having a pivot point displaced laterally from said aperature means for abutting a predetermined portion of said frame; and

(b) a handle member of a predetermined length secured to said head member at a location intermediate said first aperature means and said pivot point.

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**4,303,225**

## SELF-TAILING WINCH

**Sten Engwall, Charlottenbergs gard, Märsta, Sweden (195 00), and Clifford K. Fitch, London, England, assignors to Sten Engwall, Märsta, Sweden**

**Filed Sep. 10, 1979, Ser. No. 73,642**

**Claims priority, application Sweden, Sep. 15, 1978, 7809763**

**Int. Cl.³ B66D 1/30**

**U.S. Cl. 254—344** **7 Claims**

1. A self-tailing winch for winding a coil of rope having a load bearing end and a free end wherein the free end is releasably clamped, comprising:

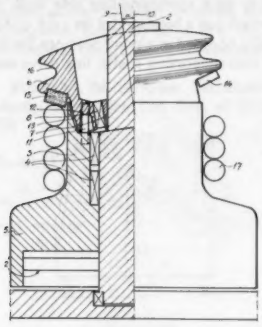
a base;

a shaft rotatably mounted on and perpendicular to said base;

a drum rotatably supported by said shaft and mounted coaxially therewith;

a flange body rotatably supported by said shaft partially within an upper portion of said drum and rotating simultaneously with said drum, said flange body having a rotational axis inclined at an angle with respect to the longitu-

dinal axis of said shaft and forming an annular and substantially planar surface facing said base such that a portion of



said annular surface is always closer to said base than the remainder of said annular surface.

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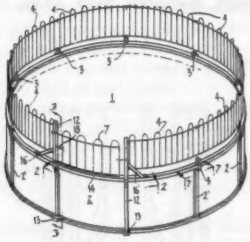
4,303,226

## SWIMMING POOL FENCE

George G. Powell, and Reece J. Powell, both of Broadford, Australia, assignors to Sinclair & Powell Proprietary Limited, Victoria, Australia

Filed Nov. 29, 1979, Ser. No. 98,615
Claims priority, application Australia, Dec. 13, 1978, PD7095
Int. Cl.³ E04H *17/18*
U.S. Cl. 256—25 20 Claims



1. A pool fence to be arranged atop a swimming pool of the type which includes a water-retaining wall, and a plurality of upright support posts disposed therearound, said fence comprising:

at least one fence section;

attachment means at each end of said at least one fence section for interconnecting ends of said at least one fence section;

mounting means including a receiving portion to which said at least one fence section is connectable; and

connecting means for connecting said mounting means to said support posts;

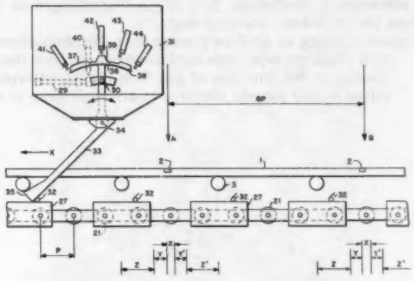
said mounting means being resilient to enable said receiving portion to be displaced to compensate for nonuniform spacing of the pool support posts with respect to the length of said at least one fence section.

4,303,227

## APPARATUS FOR CUTTING A MOVING METALLIC STRIP INTO UNIFORM PIECES

John M. A. Dompas, Olen, Belgium, assignor to Metallurgie Hoboken-Overpelt, Brussels, Belgium

Filed Dec. 21, 1979, Ser. No. 106,106
Claims priority, application European Pat. Off., Jun. 18, 1979, 79200312.1
Int. Cl.³ B23K *7/10*
U.S. Cl. 266—69 15 Claims



1. An apparatus for thermally cutting a moving metallic strip into uniform pieces, which comprises:

(a) a movable endless roller conveyor, the upper run of which carries the strip in a cutting zone, said conveyor being adapted to revolve in such a way that its upper run continuously moves in the same direction as the strip;

(b) a carriage, located above the strip and adapted to move within said zone in the same direction as the strip and in the opposite direction;

(c) means for coupling the carriage to the strip;

(d) a thermal cutting device, carried by said carriage and adapted to move transversally to the travelling direction of the strip;

(e) synchronization means for imparting to the endless roller conveyor a speed that is equal to that one of the strip; and

(f) control means including first means for sensing the position of the conveyor rollers relative to the position of the carriage and adapted to sense a multiplicity of distinct relative positions, second means operable in response to said first means for increasing the speed of the endless roller conveyor until the cutting device reaches a position at a predetermined distance from one of the rolls of the roller conveyor, third means operable in response to said first means for lowering the speed of the endless roller conveyor until the cutting device reaches a position at a predetermined distance from one of the rolls of the roller conveyor, and fourth means operable in response to said first means for preventing operation of the cutting device when the latter is within a predetermined distance from one of the rolls of the roller conveyor, said second, third and fourth means being operable during the transverse movement of the cutting device.

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4,303,228

## APPARATUS FOR HEAT TREATING CONTAINING AIR-PURGED MOLECULAR SIEVES IN $O_2$-FREE $N_2$ ATMOSPHERES

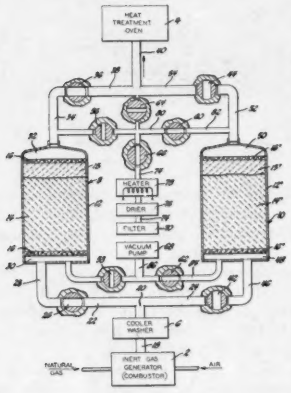
Thomas R. Snarski, Saginaw, Mich., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 883,598, Mar. 6, 1978, Pat. No. 4,203,958. This application Nov. 1, 1979, Ser. No. 90,272
Int. Cl.³ C21D *11/00*
U.S. Cl. 266—96 2 Claims

1. In apparatus for heat treating in a substantially $O_2$-free nitrogen atmosphere including: a nitrogen gas generator; a heat

treating oven; and adsorption means for drying and decarbonizing nitrogen from said generator, said adsorption means including (1) at least two, parallel-connected, molecular-sieve-type dewatering and decarbonizing gas separators, (2) appropriate plumbing for shifting the nitrogen flow from said generator alternately through said separators to said oven according to a prescribed cycle in which one of said separators adsorbs water and carbonaceous products while another of said separators is concurrently desorbed of its water and carbonaceous products, and (3) control means for effecting said shifting between separators at the end of said cycle such as to provide a substantially continuous flow of $O_2$-free nitrogen to said oven, the improvement comprising:

means defining an air flow passage from the atmosphere to each of the gas separators on the downstream side thereof relative to the direction of gas flow during adsorption; valves in said passage effective to arrest air flow to said




separators respectively during each adsorption period; automatic means operable in response to the cyclical operation of the separators effective to open said valves following each adsorption period of the separators respectively and otherwise effective to maintain said valves in closed condition; said apparatus being further constructed and arranged to admit air and a portion of said $O_2$-free nitrogen under vacuum to said other separator during desorption thereof such that (1) said air is provided in major proportions during the initial and major portion of the desorption cycle to purge the molecular sieve material therein of water and carbonaceous products, and (2) only said $O_2$-free nitrogen is provided to purge said molecular sieve material of any residual air therein immediately prior to said control means effecting said shifting, whereby a substantially continuous flow of $O_2$-free nitrogen is provided to said oven regardless of the introduction of said air to the system.

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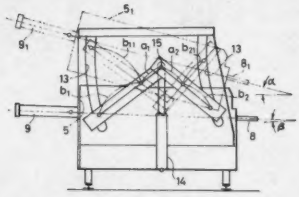
**4,303,229**

## MECHANICAL PUNCHING DEVICE FOR PUNCHING THE TUYERES OF A CONVERTER

**Yukio Iyama; Masao Fujita, and Nobuhiro Higashiiriki, all of Oita, Japan, assignors to Nippon Mining Company Limited, Tokyo, Japan**

**Filed Jul. 17, 1980, Ser. No. 169,551**
**Claims priority, application Japan, Jul. 23, 1979, 54-92666**
**Int. Cl.³ C21C 5/46**
**U.S. Cl. 266—135** **4 Claims**

1. A mechanical punching device for punching the tuyeres of a converter comprising: a mechanical puncher mounted on a movable carriage, said puncher positioned between two confronting side walls each of which is provided with a link mechanism, holding shafts extending through guide grooves in each corresponding side wall, and a punching rod driving cylinder, said link mechanism comprising two supporting shafts coupled to each corresponding side wall, two turning arms each of which has a bearing slot on each end portion and which is pivotally coupled at a point between the bearing slots to each of said two supporting shafts, link drive means having



an end shaft, said two turning arms being coupled to each other through said bearing slots formed in first end portions thereof by said end shaft of said link drive means, said bearing slots formed in second end portions of said two turning arms being coupled to said holding shafts of said mechanical puncher which extend through guide grooves formed in said side wall.

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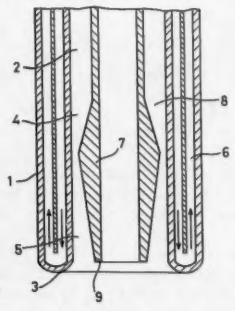
**4,303,230**

## APPARATUS FOR THE PRODUCTION OF STEEL AND IRON ALLOYS

**William Bleloch, 17 Rockridge Rd., Parktown, Johannesburg, Transvaal Province, South Africa**

**Filed Nov. 28, 1979, Ser. No. 98,251**
**Claims priority, application South Africa, Nov. 28, 1978, 78/6675**
**Int. Cl.³ C21B 7/16**
**U.S. Cl. 266—270** **3 Claims**

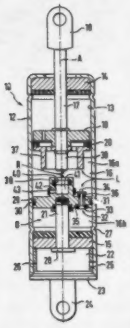



1. A water-cooled lance suitable for top-blowing molten metal with oxygen entraining hydrogen extraneously to the lance characterised in that the oxygen nozzle thereof includes an annular passage which converges and then diverges inwardly towards the longitudinal axis of the lance and the hydrogen nozzle is an inner nozzle which includes a right circular cylindrical axial passage through a member centrally located in the oxygen nozzle.

## 4,303,231
## CYLINDER-AND-PISTON ROD DEVICE

Hermann Reuschenbach, Neuwied; Winfried Wirges, Koblenz, and Rolf Langanke, Boppard, all of Fed. Rep. of Germany, assignors to Stabilus GmbH, Koblenz-Neuendorf, Fed. Rep. of Germany

Filed Oct. 29, 1979, Ser. No. 88,865
Claims priority, application Fed. Rep. of Germany, Nov. 3, 1978, 2847729
Int. Cl.³ F16F 9/02
U.S. Cl. 267—64.15 25 Claims



1. A cylinder-and-piston rod device, comprising:

(a) a cylinder having a longitudinal axis and defining a sealed cavity therein;

(b) first and second guiding and sealing units provided at first and second ends, respectively, of said cavity;

(c) a piston rod extending axially into said cavity through said first guiding and sealing unit and being axially movable relative thereto between a first terminal position, in which said piston rod extends into said cavity to a minimum extent, and a second terminal position, in which said piston rod extends into said cavity to a maximum extent;

(d) a pressurized fluid in said cavity;

(e) a plunger member extending axially into said cavity through said second guiding and sealing member and being axially movable relative thereto, the axially outer end of said plunger member being exposed to a lower pressure than the pressure of said pressurized fluid in said cavity;

(f) releasably-engageable retaining means carried in part by said plunger member and in part by said piston rod for, when engaged, holding said piston rod against movement towards said first terminal position by the force exerted on said piston rod by said pressurized fluid and, when disengaged, permitting such movement of said piston rod towards said first terminal position;

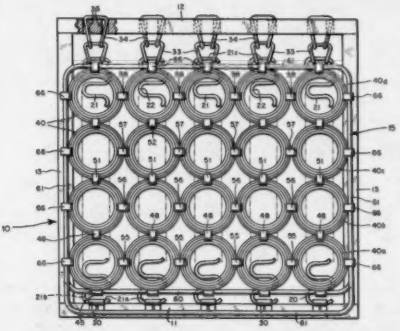
(g) blocking means carried in part by said plunger member and in part by said cylinder for blocking movement of said plunger member axially outward of said cavity in the direction of said second terminal position when said retaining means are disengaged; and

(h) releasing means carried by at least one of said piston rod, said plunger member and said cylinder for releasing said blocking means to permit said axially outward movement of said plunger member when said retaining means are engaged, whereby the force exerted on said plunger member by said pressurezed fluid at least partially compensates for said force exerted on said piston rod.

## 4,303,232
## SEAT SPRING ASSEMBLY (TORQUE-COIL)

Lawton H. Crosby, Lake Bluff, Ill., assignor to Morley Furniture Spring Corporation, Lake Bluff, Ill.

Continuation-in-part of Ser. No. 13,547, Feb. 21, 1979, abandoned. This application Oct. 5, 1979, Ser. No. 82,104
Int. Cl.³ F16F 3/10
U.S. Cl. 267—88 1 Claim



1. A seat spring assembly for upholstered furniture adapted to be mounted between the front and back rails of a seat frame, comprising:

a. a plurality of sinuous spring bands extending parallel to each other between said front and back rails;

b. each of said sinuous spring bands having a plurality of coil springs mounted on top of it;

c. the axes of said coil springs being disposed substantially vertically when said assembly is mounted between the rails;

d. the lowermost coil turns of each of said coils being clamped to a corresponding sinuous spring band;

e. the uppermost coil turns of each of said coils being clamped to corresponding coil turns of each adjacent coil;

f. an upper border wire extending horizontally around the outer periphery of said coils and being clamped to the uppermost coil turns along the sides of said spring assembly and across the back of said spring assembly;

g. said upper border wire being spaced from the coils across the front of said spring assembly;

h. a lower border wire extending horizontally around the outer periphery of said coils;

i. said lower border wire being clamped to the lowermost coil turns of each coil along the sides, back, and front of said spring assembly;

j. each of said sinuous spring bands having downwardly extending torque arm means associated therewith adjacent the back rail and adapted to induce longitudinal compression in corresponding bands when actuated by the downward movement of the seat spring assembly under load;

k. each of said sinuous spring bands being connected to said back rail by anchor means which pivots about its connection to the back rail so as to permit vertical translatory movement of the back end of the bands under load.

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## 4,303,233
## HOLDER FOR A WOODEN WORKPIECE

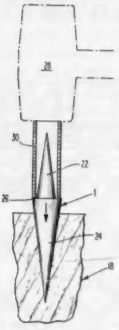
Gustave C. Meyer, III, Box 224, St. Peters, Pa. 19470

Filed Jul. 2, 1980, Ser. No. 164,494
Int. Cl.³ B23Q 1/00
U.S. Cl. 269—54.5 1 Claim

1. In combination:

a workpiece holder, comprising a first substantially elongated spike of circular cross-section for impalement of a workpiece thereon, a generally elongated second spike of

circular cross-section substantially coaxially aligned with said first spike for penetration into a massive wooden member for holding said workpiece holder, and an anvil comprising a ringlike surface concentric with and perpendicular to the common axis of said first and second spikes,



disposed substantially symmetrically around the common axis of said first and second spikes for receiving impacts to drive said second spike into said massive wooden member; and

a means for mating with said anvil and for transmitting impacts to said anvil.

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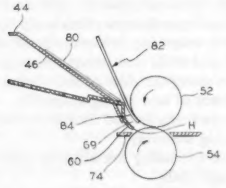
**4,303,234**

**DESKEWING DOCUMENT FEED TRAY**

**Dale Plum, Arlington Heights, Ill., assignor to Bell & Howell Company, Chicago, Ill.**

**Filed Nov. 14, 1979, Ser. No. 93,962**
**Int. Cl.³ B65H *3/06***
**U.S. Cl. 271—109** **9 Claims**



1. A deskewing document transport device comprising pickup means including at least one roller for picking up the top document from a stack of documents one at a time, means comprising an angled panel for directing said stack of documents toward said pickup means, curved guide finger means near the bottom of said angled panel, said curved guide means protruding from said angled panel towards and confronting said one roller and forming a gap which causes said documents to curl as they approach said pickup means, and horizontal table means positioned under said guide finger means for deskewing said documents as they pass through said gap.

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**4,303,235**

**PAPER CASSETTE**

**Richard A. Calabrese, Saw Mill Rd., Newtown, Conn. 06470**

**Filed Aug. 18, 1980, Ser. No. 179,302**
**Int. Cl.³ B65H *3/54***
**U.S. Cl. 271—162** **4 Claims**

1. A paper cassette for storing two different lengths of paper sheets, comprising:

a rear panel;

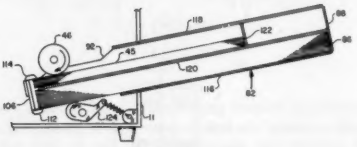
a pair of side panels extending forward from said rear panel;

a front panel operatively connected to said pair of side panels;

a bottom panel extending between the bottom of the side panels from the bottom of the rear panel about three quarters of the distance toward the bottom of the front panel;

a top panel extending between the top of the side panels from the top of the rear panel about three quarter of the distance toward the top of the front panel;

a first pair of free floating corner separators situated at the top of the corners defined by the front and side panels;



a second pair of free floating corner separators situated at the bottom of the corners defined by the front and side panels;

a flexible separator panel extending from the rear panel substantially the entire length of the cassette but spaced from said front panel and substantially bifurcating the cassette into a top portion and a bottom portion, said top portion accommodating the shorter length paper and said bottom portion accommodating the longer length paper; and

a partition extending between the side panels across the top portion of the cassette, said partition being situated a fixed distance from the rear panel to accommodate the shorter length paper.

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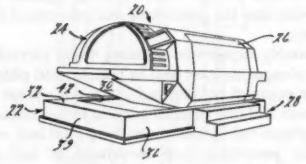
**4,303,236**

**TRIP MOTION SIMULATOR**

**Adolph Czarnecki, Birmingham, Mich., assignor to Kinop International, Inc., Detroit, Mich.**

**Filed Jul. 28, 1980, Ser. No. 173,021**
**Int. Cl.³ G09B *9/02*; A47C *1/12***
**U.S. Cl. 272—18** **9 Claims**



1. A motion simulator comprising

a passenger-holding capsule;

superimposed, essentially shallow, pitch and roll cradles disposed under said capsule;

means mounting said pitch cradle for limited fore-and-aft rocking movement with respect to said capsule;

means mounting said roll cradle in nested relation with respect to said pitch cradle and for limited transverse rocking movement with respect to said capsule; and

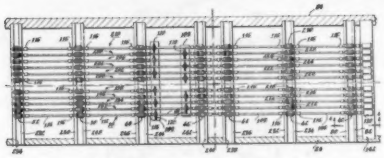
reversible drive means for rockably moving said pitch and roll cradles independently of each other.

4,303,237

## ARRANGEMENT FOR SUPPORTING THEATRICAL EQUIPMENT

Donald A. Hoffend, Jr., 3 Lake LaComa Dr., Pittsford, N.Y. 14534, and Nicholas G. Cristy, 31 Brighton Park, Rochester, N.Y. 14620

Filed Feb. 6, 1980, Ser. No. 119,032
Int. Cl.[3] B66C *23/60*; A63J *1/02*
U.S. Cl. 272—22 13 Claims



1. In a theatre having a stage floor, a proscenium opening having a height and a length, an improved arrangement for elevating and lowering batten supported stage equipment relative to the stage floor comprising:

(a) a plurality of cylindrically shaped rotary bodies;

(b) said rotary bodies horizontally orientated, concentrically aligned and spaced apart in a rectilinear array;

(c) means for supporting said array aloft above the stage floor

(d) drive shaft means for mechanically intercoupling said array of bodies for causing simultaneous rotation thereof;

(e) electric motor and rotary speed reducing drive means supported aloft and mechanically coupled to said array of bodies for causing simultaneous rotation thereof;

(f) an elongated batten for supporting stage equipment;

(g) said batten having a length for supporting stage equipment which extends for a distance substantially coextensive with the length of the proscenium opening;

(h) a flexible rope extending from each of said rotary bodies and coupled to said batten at spaced apart locations along the length of said batten;

(i) said rope means mounted to said rotary bodies for causing winding of a rope about an associated rotary body when said body is rotated in a first direction for elevating said batten and for unwinding said rope from said rotary body when rotated in a second opposite direction for lowering said batten, and,

(j) locking means coupled to said drive shaft means for selectively enabling and inhibiting rotation of said array of bodies.

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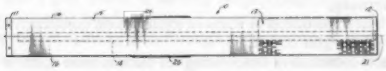
4,303,238

## DIVING BOARD WITH ENHANCED TIP PERFORMANCE

Raymond C. Rude, Reno, Nev., assignor to Arcadia Air Products, Sparks, Nev.

Filed Feb. 9, 1978, Ser. No. 876,208
Int. Cl.[3] A63B *5/08*
U.S. Cl. 272—66 11 Claims



1. A diving board comprising a top plate having a flat upper surface extending from a base end to a tip end of the board, a plurality of longitudinally extending spaced parallel ribs connected to the underside of the top plate and defining a plurality of downwardly opening longitudinal spaces, the ribs being displaced outwardly from either side of a longitudinal centerline of the top plate, and a plurality of openings formed through the top plate in a selected area of the top plate upper surface which extends from a location proximately adjacent the tip end of the board for a selected distance toward the base end of the board, the openings being formed through the top plate between the innermost ribs and the longitudinal edges of the top plate.

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4,303,239

## THIGH WEIGHTS

Richard G. Walsh, Jr., P.O. Box 1253, Boulder, Colo. 80302

Filed Sep. 27, 1978, Ser. No. 922,515
Int. Cl.[3] A63B *23/04*
U.S. Cl. 272—119 6 Claims

1. An adjustable device for use in exercising the flexor and extensor thigh muscles of an user, said device comprising in combination: a flexible belt in the form of a strip of material having a first end and a second end, said belt designed for attachment around and removal from a user's waist or hips; adjustable belt attachment means for attaching said belt around a user's waist or hips, said attachment means associated with said first and second ends of said belts, said attachment means designed to vary the circumference of said belt to securely encircle the waist or hips of the user; first and second adjustable pads, said pads slidably secured to said belt for adjustment along the length of said belt, said pads being comprised of material which is relatively more rigid than said flexible belt; first and second weight support bases, each of said bases including an attachment portion and a body portion, the attachment portion of said first weight support base secured to said first pad and the attachment portion of said second weight support secured to said second pad, said bases being secured to said pads in such a manner that movement or adjustment of either of said pads along the length of said belt allows and results in the concurrent movement or adjustment of the attached base, said attachment portion of each said support base being attached to its associated pad by a flap, said flap being attached to said base and folded over and around a pad, and fastened back onto itself; and means for securing adjustable amounts of weight to each said support base, said means for securing adjustable amounts of weight to each support base including at least one pocket into which weights may be inserted and secured.

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4,303,240

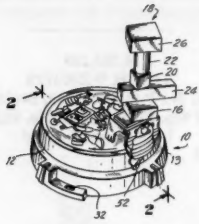
## MOVING BLOCK GAME

Steven Ellman; Fredric Ellman, both of 1672 E. 7th St., Brooklyn, N.Y. 11230; George Lerner, 12 Prospect Ct., Freeport, N.Y. 11520, and Julius Ellman, 1672 E. 7th St., Brooklyn, N.Y. 11230

Filed Feb. 13, 1980, Ser. No. 120,998
Int. Cl.[3] A63F *9/00*
U.S. Cl. 273—1 GF 22 Claims

1. A game comprising a base adapted to be placed on a substrate, such as a floor, a movable table mounted on said base, drive means for moving said table in one plane, and means for gradually raising and then lowering said table relative to said plane, means defining a designated playing area

attached to said movable table and a plurality of playing blocks, wherein said playing blocks are sequentially placed on



said designated area or on another playing block by one or more players while said movable table is continuously moved in said plane and intermittently raised and lowered.

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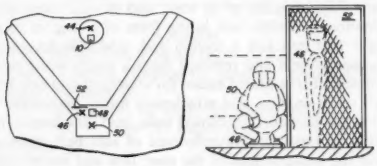
**4,303,241**

## SPORTS VISION TRAINING DEVICE

**Wayne A. Burroughs, 630 Arnold La., Winter Springs, Fla. 32708**

**Filed Aug. 11, 1980, Ser. No. 177,116**
**Int. Cl.³ A63B 71/02**
**U.S. Cl. 273—26 C** **18 Claims**



1. A vision training device for a sports player comprising:
a. sensor means for generating a timing signal when the trajectory of a ball commences from a predetermined release area;
b. timing means coupled to said sensor means for receiving the timing signal and for generating a delayed output signal at a predetermined time interval after the timing signal is received; and
c. means coupled to said timing means and positioned in the player's line of vision between the player and the location of the ball release area for interrupting the player's view of the ball when said timing means generates the delayed output signal, whereby the player can observe the trajectory of the ball for only a predetermined distance after it is released.

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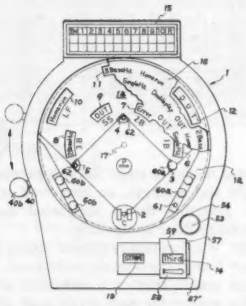
**4,303,242**

## TOY FOR PLAYING BASEBALL GAME

**Masaharu Ohki, 13-17-208, Ichikawa Minami 3-chome, Ichikawa-shi, Chiba-ken, Japan**

**Filed Jul. 21, 1980, Ser. No. 169,507**
**Int. Cl.³ A63F 7/06**
**U.S. Cl. 273—93 R** **10 Claims**

1. A toy for playing a baseball game by players comprising:
a main body of said toy and a cover member for covering said main body;
said main body including:
a first rotary member bearing on the outer surface thereof plural displays for displaying the kind of pitching in said baseball game and plural displays for displaying the kind of offense in said baseball game;
a second rotary member bearing on the outer surface thereof plural displays for displaying the kind of fielding in said baseball game;
driving means for rotating said first and second rotary members in the interlocking arrangement with each other;
first stopping means for stopping the rotation of said first rotary member; and
second stopping means for stopping the rotation of said second rotary member; and
said cover member including:



a first window allowing the players to see therethrough one display of said displays on said first rotary member for displaying the kind of pitching;
a second window allowing the players to see therethrough one display of said displays on said first rotary member for displaying the kind of offense; and
a plurality of third windows, each allowing the players to see therethrough one display of said displays on said second rotary member.

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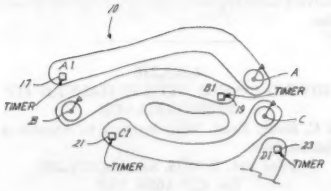
**4,303,243**

## SYSTEM AND METHOD OF TIMING GOLFERS ON A GOLF COURSE

**Noah T. Wolfe, 8405 Slant Oak Dr., Round Rock, Tex. 78664**

**Filed Jun. 17, 1980, Ser. No. 160,348**
**Int. Cl.³ A63B 69/36**
**U.S. Cl. 273—176 R** **5 Claims**

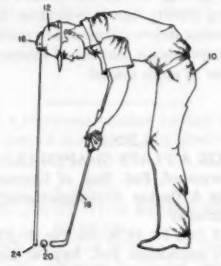


1. A golf course including a system for timing play of golfers comprising,
a timer positioned at selected locations on consecutive holes of the golf course,
each consecutive timer being set back in time relative to its preceding timer an amount equal to a predetermined group playing time between each timer and its preceding timer,
each timer having an assigned mark for each group of golfers and each timer having an indicator moving relative to the assigned marks for indicating at each of said selected locations whether the group of golfers arrived early, late or on time relative to the predetermined playing time from the preceding timer.

## 4,303,244
## METHOD FOR DETECTING GOLFER'S HEAD MOVEMENT WHEN PUTTING

Charles P. Uppvall, 453 Clapboardtree St., Westwood, Mass. 02090

Filed Feb. 9, 1981, Ser. No. 233,022
Int. Cl.[3] A63B *69/36*
U.S. Cl. 273—183 B 1 Claim



1. An improved method of preventing head movement of a golfer when putting a golfball comprising the steps of:
   - providing a cap member for a golfer to wear with light-emitting means to project a spot beam of light when said cap is worn;
   - projecting said spot beam of light from said light-emitting means in said cap to a first position in the vicinity of said golfball;
   - observing the position of said first light spot;
   - putting in a normal fashion while said golfer tries not to move his head; and
   - observing the position of said light spot again to determine if said spot has moved from said first position to a second position.

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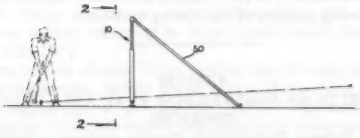
## 4,303,245
## GOLF SWING TEACHING AID

Charles V. Brockett, 22825 Brenford, Woodland Hills, Calif. 91364

Filed Apr. 22, 1980, Ser. No. 142,693
Int. Cl.[3] A63B *69/36*
U.S. Cl. 273—185 R 8 Claims

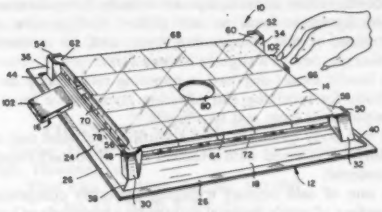


1. A golf swing teaching aid device to be placed between a golfer and a golf course or driving range, comprising:
   - a free standing opaque screen of generally inverted U-shape, having an opening therethrough at the bottom thereof and including means for absorbing the force of impact of golf balls to cause impacting golf balls to fall harmlessly downward,
   - wherein said opaque screen and said opening are conconfigured to allow the passage of struck golf balls completely therethrough and thereby permit the normal flight thereof,
   - and further wherein said opaque screen is configured to completely block the view of said golfer of the flight of the struck golf ball.

## 4,303,246
## TABLE GAME

Ned Strongin, 7 E. 35th St., New York, N.Y. 10016

Filed Apr. 15, 1980, Ser. No. 140,434
Int. Cl.[3] A63F *3/00*
U.S. Cl. 273—271 9 Claims



1. A table game comprising a game board having a plurality of upwardly-directed support members, a transparent cover removably mounted on said support members and supported thereby in a position in which it is parallel to and spaced above the upper surface of said game board, a matrix array of channel means disposed on the upper surface of said game board, a first plurality of game pieces identified as belonging to a first player, and a second plurality of game pieces identified as belonging to a second player, each of said game pieces having engaging means for releasably engaging said channel means, each of said playing pieces having end edges positioned to bear against end edges of adjacent game pieces when engaged in said channels, said channel means being of sufficient size to receive and retain columns of playing pieces extending in a first horizontal direction and rows of playing pieces extending in a second horizontal direction perpendicular to said first direction, with the players alternately inserting their respective playing pieces from the sides of the playing board between the upper surface of said playing board and said transparent cover until one player has formed a complete row, column or diagonal line of his inserted playing pieces.

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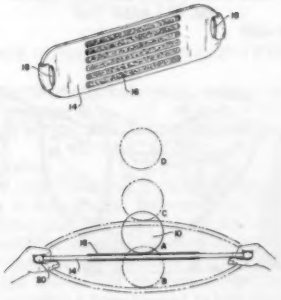
## 4,303,247
## CATAPULT GAME

David A. Fain, 1933 Lamont St., Kingsport, Tenn. 37664

Continuation-in-part of Ser. No. 965,934, Dec. 4, 1978, abandoned. This application Jun. 27, 1980, Ser. No. 163,640
Int. Cl.[3] A63B *65/12*
U.S. Cl. 273—324 10 Claims



1. Apparatus for missile launching and catching comprising
   (a) a missile in the shape of a spheroid having at least a portion of its surface defined by an outwardly presented face provided with a first type of contact engaging material;

(b) a flexible, resilient, self-supporting body of sheeting material capable of manipulation with two hands, the shape of which is substantially biaxially symmetrical, the longitudinal axis of which is substantially greater than the transverse axis, said sheeting material being constructed and arranged to permit said body to be flexibly transformed from a resting planar configuration to a concave configuration under compressive force, from said concave configuration back to said planar configuration upon release of said compressive force, and, by momentum, therebeyond to a slightly convex form;
(c) handle means disposed in opposing relationship on said body for receiving and releasing compressive force manipulations from said two hands;
(d) said body having at least a portion of at least one of its surfaces covered with a second type of contact engaging material;
(e) one of said contact engaging materials comprising a surface of textile material defined by a multitude of irregular filamentary formations and the other of said contact engaging materials comprising a covering being composed of upstanding hook-like filamentary formations adapted for removably retentive imbediment in said irregular filamentary formations;
(f) whereby in a first mode, when said missile is directed against the contact engaging material of said body, said first and second types of contact engaging material engage with each other to removably retain said missile on said body in the area of impact; and, in a second mode,
(g) said body having an overall balance of general mechanical properties such that when said missile is engaged and interlocked to said second type of contact engaging material, said body can be manually flexed by compressive force applied at the handle means thereof directed along the longitudinal axis, from a resting planar configuration to a concave configuration such that the missile is removably retained in the concavity of said body, and then by rapid release of said compressive force said body can flex back to its planar configuration and, by momentum, therebeyond to a slightly convex configuration whereupon rapid longitudinal compressive force can again be applied to rapidly form said body into an exaggeratedly convex configuration and thereby propel the missile from said body in the direction of convexity.

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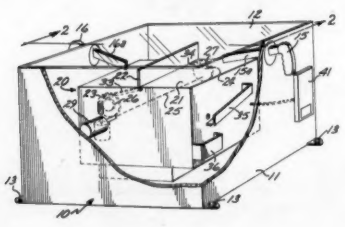
**4,303,248**

## MANUALLY DIRECTED COIN GAME

**Stephen P. Shoemaker, Jr., 123 S. Harbor Dr., Redondo Beach, Calif. 90277, and Foster M. Brashear, 2402 Grand Canal, Venice, Calif. 90291**

**Filed Dec. 4, 1978, Ser. No. 965,876**
**Int. Cl.³ A63F 7/02**
**U.S. Cl. 273—356** **3 Claims**



1. A token dispensing game device, comprising:
(a) a first housing supported upon ground and having a top surface aligned in a substantially horizontal plane;
(b) a second housing wholly enclosing said first housing and being secured to ground separately therefrom, a surface portion of said second housing being transluscent whereby said top surface of said first housing is viewable therethrough;
(c) a dam disposed upon said first housing and deployed to slidably translate over a portion of said top surface;
(d) coin dispensing means extending through a lateral surface of said second housing for directing the passage of coins onto said top surface;
(e) coin receiving means for collecting such coins as are pushed over an edge of said top surface by said dam and for producing sensing signals indicative thereof; and
(f) token dispensing means connected to receive said sensing signals for dispensing a number of tokens corresponding to the number of coins sensed.

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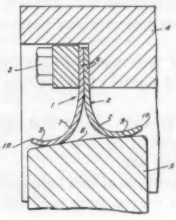
**4,303,249**

## SEAL FOR A PLATE-SHAPED CLOSURE

**Alois Illy, Limburgerhof, Fed. Rep. of Germany, assignor to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Fed. Rep. of Germany**

**Filed Jun. 19, 1979, Ser. No. 49,975**
**Claims priority, application Fed. Rep. of Germany, Jul. 1, 1978, 2829066**
**Int. Cl.³ F16J 15/32**
**U.S. Cl. 277—152** **10 Claims**



1. In a closing arrangement of the type including a housing member bounding an opening and a plate-shaped closing member extending across the opening and defining with the housing member a gap of a predetermined width in a closing position thereof, a seal for closing the gap, comprising two resilient metallic sealing lips commonly detachably mounted on one of the members in surface contact with one another at the mounting region, extending from said mounting region across the gap, and having an effective width exceeding that of said gap both simultaneously to press against the other of said members in the closing position of the closing member.

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**4,303,250**

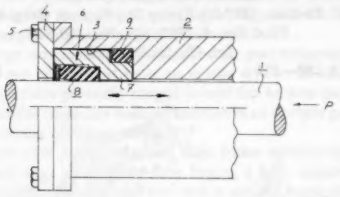
## SEALING IN AN ADAPTER FOR AVAILABLE SEALING GROOVES

**Per-Ake Persson, Teckomatorp, Sweden, assignor to Stefa Industri Aktiebolag, Landskrona, Sweden**

**Filed Dec. 11, 1979, Ser. No. 102,579**
**Claims priority, application Sweden, Jan. 11, 1979, 7900270**
**Int. Cl.³ F16K 41/00**
**U.S. Cl. 277—189** **28 Claims**

1. An adaptor for sealing grooves of a cylinder for sealing a reciprocating piston rod, comprising an adaptor body, the outer dimensions of which substantially correspond to those of the sealing groove of the cylinder and which is formed with a radially inner sealing means providing a seal between the piston rod and the adaptor body, said radially inner sealing means is provided at or adjacent the end of the adaptor body which is opposite an end facing a pressurized chamber, said radially inner sealing means comprises a sealing ring having a rectangular or elongated cross section form disposed in said

sealing ring groove which sealing ring groove, adjacent the end of the cylinder ring groove facing said pressurized cham-



ber is formed with a thickened portion having less diameter than the remaining part of the sealing ring groove.

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**4,303,251**

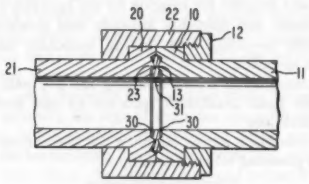
## FLANGE SEALING JOINT WITH REMOVABLE METAL GASKET

**David J. Harra, Palo Alto, and William C. Nystrom, Santa Clara, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.**

**Continuation of Ser. No. 966,230, Dec. 4, 1978, abandoned. This application Jul. 18, 1980, Ser. No. 170,233**

**Int. Cl.³ F16J *15/08***

**U.S. Cl. 277—236** **6 Claims**



1. An all metal joint comprising:

a pair of flange members, each flange member having a face portion configured to confront a corresponding face portion on the other flange member when said flange members are joined, said flange members making contact with each other at a junction plane;

said face portion of each flange member comprising a first annular surface region, the first surface region on one flange member intersecting the first surface region on the other flange member at said junction plane, said first surface regions enclosing an angle therebetween that is less than 180°;

said face portion of each flange member further comprising a second annular surface region and a third annular surface region, said second and third surface regions intersecting each other to form a ridge, said ridge being spaced apart from said junction plane, said second surface region intersecting said first surface region on said face portion of each flange member to form in the face portion of each flange member an annular recess bounded by said first and second surface regions;

said ridge on one of said flange members confronting and spaced apart from said ridge on the other flange member when said flange members are joined;

a continuous annular gasket of soft metal configured to be received between said face portions, said ridge on the face portion of each of said flange members penetrating into said gasket when said flange members are joined, whereby gasket material extrudes into said recess and contacts the first surface region on the face portion of each flange member when said flange members are joined;

said first and second surface regions on the face portion of each of said flange members being configured so that the volume of said recess formed thereby is larger than the volume of gasket material that can be extruded into said recess when said flange members are joined; and

the distributive compressive force exerted by each of the first, second and third surface regions of the face portion of each flange member upon the gasket material having a component perpendicular to said junction plane, which component acts in a direction tending to separate the gasket from the flange members when the flange members are moved away from each other.

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**4,303,252**

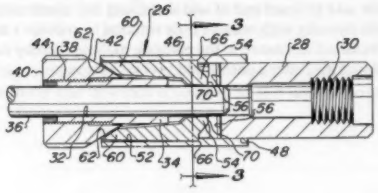
## CHUCK FOR ROTARY TOOL

**Philip A. Snider, Hicksville, Ohio, assignor to Cooper Industries, Inc., Houston, Tex.**

**Filed Mar. 21, 1980, Ser. No. 132,580**

**Int. Cl.³ B23B *31/14, 31/18***

**U.S. Cl. 279—35** **10 Claims**



1. A chuck for a rotary tool or the like comprising:

a body including a portion at one end adapted to be rotatably connected to a drive spindle or the like;

an axial bore in said body opening toward the other end of said body for receiving and supporting a shank of a rotary work performing member;

a sleeve surrounding and fixedly secured to said body and forming an annular space between said body and an inner wall surface of said sleeve;

at least two jaws disposed on said chuck and being engageable with said shank, each of said jaws including respective generally axially extending levers for pivotally moving said jaws generally radially inwardly with respect to the axis of said bore into shank engaging position; and

means on said chuck engageable with said levers for pivotally moving said levers radially outwardly with respect to the axis of said bore to cause said jaws to forcibly engage said shank for retaining said shank in said bore.

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**4,303,253**

## ROLLER SKATE CONSTRUCTION HAVING PIVOTAL HEEL

**John Rottenkolber, Mohegan Lake, N.Y., assignor to Ronald Kestenbaum, Brooklyn, N.Y.**

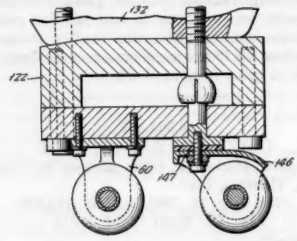
**Filed Sep. 26, 1980, Ser. No. 190,968**

**Int. Cl.³ A63C *17/04***

**U.S. Cl. 280—11.27** **2 Claims**

1. In a roller skate including a platform element and a wheeled means at forward and rearward ends thereof and having means for engaging the foot of the user to an upper surface of said platform element, improved means for permitting lateral movement of a rear portion of said platform relative to a principal axis of said platform comprising: a rear wheel element including a body secured to said platform element at the rearward end thereof, at least one caster mounted upon and extending downwardly from a lower surface of said body, said caster including a vertically extending shaft pivotally associated with said body, a caster housing carried by said shaft, and a wheel arranged for rotation about a horizontal axis offset with respect to the axis of said vertically extending shaft;

and at least one wheel on said rear wheel element, the axis of which is fixed perpendicular to the principal axis of said skate, and positioned such that the lower periphery thereof continuously lies in a common horizontal plane with the lower periphery of said wheel of said caster and said forward wheeled




means whereby when said user executes a pivotal movement about said forward end of said skate, said last mentioned wheel is slid laterally with relative little rotation to provide a measure of frictional resistance to the pivoting motion, thereby enabling said user to better control said pivotal movement.

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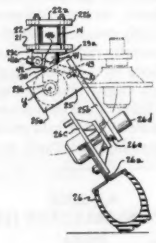
**4,303,254**

**RETRACTABLE CASTER WHEEL FOR A TRAILER**

**Rodney C. Swanson, 7720 Lloyd Dr., Cherry Valley, Ill. 61016, and James O. Hutchens, 837 Baxter Wood La., Janesville, Wis. 53545**

**Filed Apr. 21, 1980, Ser. No. 142,102**
**Int. Cl.³ B62D *35/00***
**U.S. Cl. 280—43.2** **14 Claims**



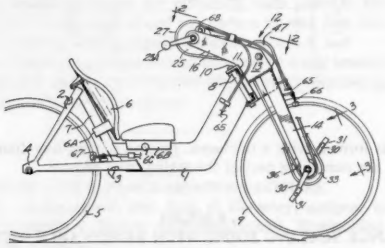
**1.** In a wheeled trailer having a tongue adapted for connection to a towing vehicle, a retractable wheel support for the tongue comprising: a stationary mounting bracket and means for rigidly attaching the stationary mounting bracket to the trailer tongue, a swivel bracket, means mounting the swivel bracket on the mounting bracket for turning movement relative thereto about a generally upright swivel axis, a wheel support bracket and a wheel rotatably mounted on the wheel support bracket, means mounting the wheel support bracket on the swivel bracket for turning relative thereto about a generally horizontal swing axis between a lowered position in which the wheel axis is generally horizontal and a raised position in which the wheel axis is generally upright, and means acting between the swivel bracket and the wheel support bracket selectively operable to retain the wheel support bracket in said lowered position relative to said swivel bracket.

**4,303,255**

**VEHICLE MULTISPEED DRIVE SYSTEM UTILIZING ARM AND LEG POWER**

**John C. Thomas, 1557 McKinley St., Eugene, Oreg. 97402**

**Filed Jan. 4, 1980, Ser. No. 109,644**
**Int. Cl.³ B62M *1/12***
**U.S. Cl. 280—234** **11 Claims**



**1.** A drive system for a vehicle enabling use of the operator's arms and legs to provide a source of motive power to a vehicle wheel, said system comprising,

a live axle and sprocket combination adapted for rotation by the operator's legs,

a powered wheel assembly rotatably journalled on said live axle, said wheel assembly including a sprocket and hub,

a hand crankshaft and sprocket combination having handgrips and adapted for rotation by the operator's arms,

a multispeed hub assembly adjacent said powered wheel assembly including hub driving sprockets and a hub driven sprocket,

power transmission means coupling the live axle sprocket and the hand crankshaft sprocket to said hub driving sprockets, and

drive transmission means coupling the hub driven sprocket to the powered wheel assembly.

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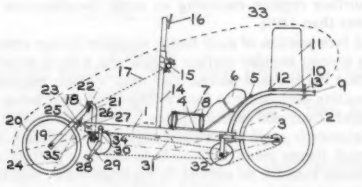
**4,303,256**

**BICYCLE OF THE KIND HAVING THE SEAT PLACED LOW SO THAT THE LEGS OF THE RIDER ARE SUBSTANTIALLY HORIZONTAL**

**Peder S. Mortensen, Box 396, Hudson, Quebec, Canada**

**Filed Oct. 10, 1979, Ser. No. 83,365**
**Claims priority, application Canada, Oct. 18, 1978, 313649**
**Int. Cl.³ B62M *1/02*; B62K *21/02***
**U.S. Cl. 280—261** **1 Claim**



**1.** A bicycle comprising:

a main frame member including a substantially horizontal tube of high torsional stiffness;

a rear fork including two substantially horizontal tubes attached to said mainframe member and a rear wheel mounted between said horizontal tubes;

a seat including a bottom flat sheet connected to said main frame member, a back rest flat sheet, an air bladder resting on said bottom flat sheet and said back rest flat sheet, a top flat sheet resting on said air bladder, and cords passing

around said flat sheets and said air bladder for holding them together;

a first tube penetrating said main frame member behind said bottom flat sheet and curving upwardly and rearwardly for supporting said back rest flat sheet;

a baggage carrier including a flat bottom part mounted at the rear end of said first tube, an upside down can of highly visible color pivotally hinged to said flat bottom part, and means for releasibly locking said can in an upright position preventing pivoting thereof;

a second tube penetrating said main frame member in front of said seat, said second tube having a first, substantially vertically extending portion and a second vertically and laterally extending portion extending from said first portion;

a steering bar supported on said first portion;

a rear view mirror mounted on said second portion;

a third tube penetrating said main frame member at the front thereof and curving upwardly and forwardly;

a spring resiliently mounting said third tube to said main frame;

a front fork including a cross bar, a first thrust bearing pivotally mounting said cross bar to said third tube, two straight tubes connected to said cross bar and extending downwardly and forwardly therefrom, a front wheel mounted between said two straight tubes, a first gusset plate connected to said two straight tubes, a second gusset plate pivotally connected to said main frame member, and a second bearing interconnecting said first and second gusset plates, said first and second bearings being aligned to form a steering axis extending through the point where the front wheel touches the ground; cable means interconnecting said cross bar to said steering bar for transmitting steering control therebetween;

a pedal crank mounted on said main frame forward of said seat whereby the legs of the rider are substantially horizontal in the actuation of said pedal crank; and

means for transmitting drive power from said pedal crank to said rear wheel, the centerline of said transmitting means being positioned below said rear fork tubes whereby the bending loads on said fork tubes is limited.

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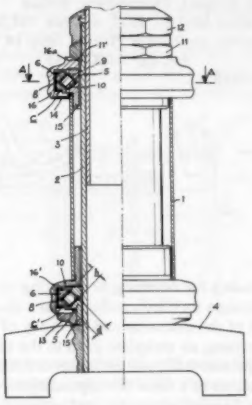
**4,303,257**

## STEERING MECHANISM FOR BICYCLES, MOTORCYCLES AND THE LIKE

**Dino Perotti, and Mario Perotti, both of via Gozzano 3, Sarezzo, Brescia, Italy**

**Filed May 29, 1979, Ser. No. 43,345**
**Claims priority, application Italy, Dec. 22, 1978, 5289 A/78**
**Int. Cl.³ B62K *21/04***
**U.S. Cl. 280—279** **7 Claims**

1. A steering mechanism for bicycles, motorcycles and the like, comprising a tubular portion integral with the frame of the vehicle, and a cylinder extending coaxially in said tubular portion and telescopically attached on one end to the extension of the handlebar and at the other end to the fork of the wheel to be steered, between said tubular portion and said cylinder there being interposed two axially spaced apart, upper and lower bearing assemblies each comprising concentric, inner and outer races defining therebetween an annular groove having a square cross section, in said groove there being seated and guided a plurality of cylindrical rollers that are alternately inclined in opposite directions to thereby result in pairs of said cylindrical rollers positioned perpendicular to one another and inclined with respect to the axis of the steering mechanism, said inner race of each said bearing assembly being provided with an axial extension the upper one of which is coupled to said tubular portion and the lower one of which is coupled to said cylinder, while said outer race of each said bearing assembly is forcedly seated and coupled to upper and lower supporting



elements, the upper one of which is coupled to said cylinder and the lower one of which is coupled to said tubular portion.

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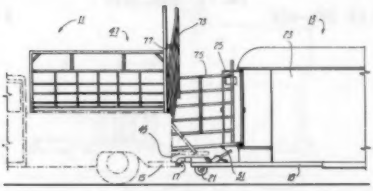
**4,303,258**

## ANIMAL CARRIER AND PASSAGEWAY

**Woodrow G. Davis, Rte. 1, Marlow, Okla. 73501**

**Filed Oct. 5, 1979, Ser. No. 82,106**
**Int. Cl.³ B60D *5/00*; B60P *3/04***
**U.S. Cl. 280—403** **7 Claims**



6. An animal enclosure and passageway for a pickup truck having a walled bed and a rear gate, comprising:

wall extensions which extend upwardly from the upper portions of the truck bed walls to contain animals in the bed area of the pickup truck;

a rear wall extending upwardly from the bed of the pickup truck inside the rear gate;

said rear wall having an opening to allow the passage of animals therethrough;

a walking board adapted for extension over the rear gate of the pickup truck to said opening for supporting animals as they walk over the rear gate to said opening;

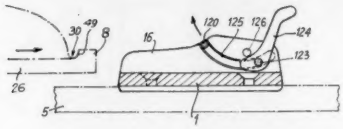
two extensible side rails connected to said rear wall and movable between a position along said walking board for containing the animals as they walk on said walking board over the rear gate to said opening and a stowed position which allows the rear gate of the pickup truck to be closed; and

a rear wall gate disposed for selectively opening and closing said opening said said rear wall, said gate being movable from a raised, open position to a lowered, closed position to regulate movement of animals into and out of the walled bed of the pickup truck along said walking board.

## 4,303,259
## SKI BINDING

Pentti Riikonen, Lahti, Finland, assignor to Adidas Fabrique de Chaussures de Sport, Landersheim, France

Filed May 12, 1977, Ser. No. 796,240
Claims priority, application Finland, May 14, 1976, 761383
Int. Cl.[3] A03C 9/18
U.S. Cl. 280—615 6 Claims

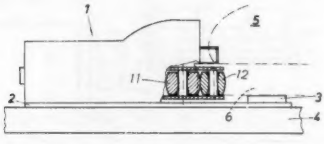


1. A ski binding for fastening to a touring or cross country ski, a boot having a forward extension and a shoulder between the front end of the extension and the body of the boot, said binding comprising, an archplate fixed to the ski and comprising two upright sidewalls, said archplate defining an upwardly open cross section of a form corresponding to the height and width of the forward extension, and means for locking the forward extension to the archplate against rearward and upward movement with respect to said archplate and comprising a fastening device having a horizontal portion movable downwardly relative to the walls of the archplate to a fastening position engaging said shoulder and maintaining said extension locked between said upright walls of the archplate.

## 4,303,260
## SAFETY SKI BINDING

Edgar Poellmann, Vienna, Austria, assignor to TMC Corporation, Baar, Switzerland

Filed May 17, 1979, Ser. No. 39,887
Claims priority, application Austria, May 19, 1978, 3666/78
Int. Cl.[3] A63C 9/00
U.S. Cl. 280—625 9 Claims

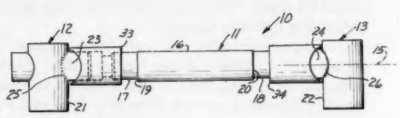


1. In a safety ski binding having a base plate adapted to be mounted on a ski and at least one lever arm pivotally secured to said base plate and for movement with respect thereto about an upright first axis between a ski boot holding position and a ski boot releasing position, the improvement comprising at least one roller member rotatably mounted on said lever arm and about an upright axle having a second axis, said roller being positioned to engage said ski boot at least when said lever arm is in any position between said ski boot holding position and said ski boot releasing position, including said ski boot releasing position, said roller having a central opening therethrough, the interior wall of said central opening converging from the axial ends of said roller toward a location intermediate said axial ends, the diameter of said central opening adjacent said axial ends being greater than at said intermediate location, the diameter of said central opening at said intermediate location being equal to or slightly greater than the diameter of said axle whereby the axis of said roller is able to adjust to an inclined relation to said second axis of said axle in response to varying forces applied by said ski boot to the exterior of said roller during a release of said ski boot from said ski binding.

## 4,303,261
## PIPE SYSTEM INCLUDING READILY REMOVABLE PIPE LINK

Robert R. Reddy, 1195 Michillinda Ave., Pasadena, Calif. 91107

Filed Jan. 14, 1980, Ser. No. 111,642
Int. Cl.[3] F16L 21/08
U.S. Cl. 285—31 26 Claims



1. A pipe system comprising:

a first and a second buttress member, each said buttress member comprising a support tube, and at least one of them further including a camming surface, said support tubes being axially aligned and spaced from one another, said camming surface being formed on a substantially cylindrical outer wall intersecting normally the outer wall of its respective support tube;

a tubular follower member coaxially surrounding said support tube of the buttress member which includes said camming surface, and being axially movable and rotatable thereon, an end of said follower member bearing against said camming surface and being non-circular and so proportioned and arranged as to cause said follower member to assume different axial positions along said axis at different angular positions around said axis, said follower member thereby having first and second angular positions corresponding to first and second axial positions;

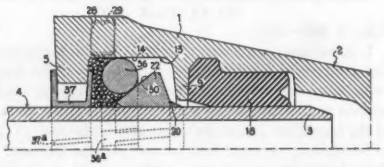
a pipe link comprising a rigid length of pipe having a length short enough to fit between said support tubes and said follower member when said follower member is in one of said positions, and to be trapped by it in the other of said positions; and

means connecting the end of said pipe link not engaged by said follower member to a support tube.

## 4,303,262
## LARGE DIAMETER PIPE JOINT WITH MEANS FOR DISTRIBUTING TENSILE FORCES

Michel Pierrel, Pont-A-Mousson, and Jean-Pierre Vitel, Blenod Les Pont-A-Mousson, both of France, assignors to Pont-A-Mousson S.A., Nancy, France

Filed Nov. 7, 1979, Ser. No. 91,998
Claims priority, application France, Nov. 13, 1978, 78 31994
Int. Cl.[3] F16L 27/00
U.S. Cl. 285—232 7 Claims



1. A watertight joint between a male end of one pipe and a mouth end of a second pipe, where there is a possibility of the two pipes not being perfectly aligned with one another, comprising: sealing means between said male end and said mouth end, respective opposite support means on said male end and said mouth end, bracing means arranged between said opposite support means for distributing tensile forces over the complete periphery of the joint and comprising an incompressible mass of an initially fluid filler material comprising solid spherical particles and at least one annular bearing element, and wherein

the support means of the mouth end is defined by an inside flange (5) of the mouth end and a radial wall thereof and that of the male end is defined by a split guard ring (22) encircling said male end and bearing against a radial shoulder (21) of said male end and against said annular bearing element, and means containing said incompressible mass within said joint in an annular space defined between a pair of axial bearing surfaces including said radial wall of said mouth end and said annular bearing element, said annular space allowing redistribution of said incompressible mass upon misalignment of said pipes, a further annular space being defined between said annular bearing element and an interior radial flange (9) of said mouth.

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**4,303,263**

## INSTANT FITTING FOR REINFORCED MULTILAYER FLEXIBLE TUBINGS FOR FLUIDS

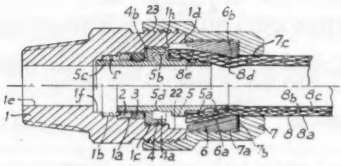
**Andre Legris, St-Maur, France, assignor to Societe Legris France S.A., Ozoir-la-Ferriere, France**

**Continuation of Ser. No. 829,569, Aug. 31, 1977, abandoned. This application Sep. 22, 1980, Ser. No. 189,647**

**Claims priority, application France, Mar. 9, 1977, 77 06998**

**Int. Cl.³ F16L *33/18***

**U.S. Cl. 285—249** **10 Claims**



1. A fitting for connection to a tube at a cut end portion thereof, which fitting comprises in combination a hollow body; a tubular bushing supported within said body and axially moveable relative thereto between an inward limit position and an outward limit position, said bushing having projections disposed to internally grip the tube to be connected to the fitting, said body and bushing having mutually interfering parts that coact when the bushing is in its inward limit position to constrain said bushing against further inward axial movement and against rotation to aid the emplacement of the tube end portion into gripping engagement with the projections of the bushing, said body having an inlet allowing the insertion of the end portion of the tube into the fitting for gripping engagement with the bushing; and a ring within said body and positioned in circumferentially surrounding relation to the tube end portion inserted into the fitting, said ring having a conical surface portion, said bushing being axially moveable to an outward limit position at which the end portion of the tube gripped by the the bushing is compressed between the bushing and the conical portion of said ring to establish a fluid-tight seal thereat, said ring, end portion of the tube, and bushing being rotatable in unison relative to said body, and constrained against further outward axial movement relative to said body when the bushing is in said outward limit position.

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**4,303,264**

## WINDOW LATCH

**Takeo Uehara, Uozu, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan**

**Filed Aug. 14, 1979, Ser. No. 66,316**

**Claims priority, application Japan, Aug. 14, 1978, 53-111279[U]**

**Int. Cl.³ E05C *9/04***

**U.S. Cl. 292—7** **12 Claims**

1. A window latch for acting between a pair of first and second meeting window stiles, comprising:

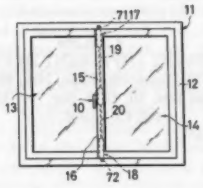
(a) a base plate adapted to be mounted on the first stile;

(b) a cam keeper adapted to be attached to the second stile;

(c) latch cam means adapted to be rotatably mounted on the first stile for locking engagement with said cam keeper;

(d) a slide plate movably mounted on said base plate and having first engaging means;

(e) means operatively connected to said latch cam means and said slide plate for moving said slide plate in a first direction in response to turning of said latch cam means; and



(f) locking means supported on said base plate and having second engaging means normally engaging said first engaging means for preventing movement of said slide plate and turning of said latch cam means, said locking means being movable in a second direction transverse to said first direction in response to the engagement thereof with the second stile, for allowing said second engaging means to disengage from said first engaging means.

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**4,303,265**

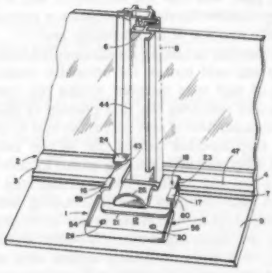
## LOCK FOR HORIZONTAL SLIDING WINDOW

**Eugene R. Beard, 3186 Reva Dr., Concord, Calif. 94519**

**Filed Mar. 3, 1980, Ser. No. 126,989**

**Int. Cl.³ E05C *1/04***

**U.S. Cl. 292—145** **3 Claims**



1. A lock for a window having a fixed sash and a horizontally slidable sash formed with a stile and a lower rail mounted within a frame including a sill member, said lock comprising:

a. a base member including a base portion, front and rear stop members attached to said base portion and guide members attached to said front stop member;

b. a catch member mounted in sliding registration with said base member between unlocked and locked positions including,

(1) a support portion,

(2) a rear abutment portion connected to said support portion mounted for engagement with said rear stop member,

(3) a front abutment portion connected to said support portion mounted for engagement with said front stop member,

(4) a catch portion mounted on said support portion positioned in sliding registration with one of said guide

members and positioned for engagement with said bottom rail in said locked position;

(5) a barrier member mounted on said support portion positioned in sliding registration with the other of said guide members and positioned for engagement with said stile in said locked position,

(6) a finger engageable control member connected to said catch member for movement of said catch member between said unlocked and locked positions; and

c. means attaching said base member to said sill member.

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**4,303,266**

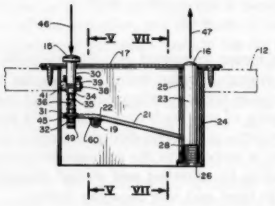
## ENTRY IMPEDIENT DEVICE

**Harry Volpi, 1935 Humboldt, Reno, Nev. 89509**

**Filed Dec. 10, 1979, Ser. No. 102,159**

**Int. Cl.³ E05C *1/12***

**U.S. Cl. 292—166** **8 Claims**



**1.** A device for preventing unauthorized opening of a door comprising:

a housing;

a top plate closing off one end of said housing;

a button extending through an opening in said top plate having a first portion substantially flush with said top plate and a second portion extending through said opening in said top plate and into the interior of said housing;

a door stop member having a first portion normally disposed within the interior of said housing; and

door stop member actuating means coupled to both said stop member and said button for normally retaining the first portion of said stop member within the interior of said housing and releasing the first portion of said stop member, upon actuation of said button, so that said first portion of said stop member moves out of the interior of said housing wherein said actuating means includes a cross rod having a first end fixedly secured to said stop member and a second end engaging button actuating means abutting against said button, and wherein said actuating means also includes an actuating lever pivotally mounted in said housing, said lever including a first end abutting said second portion of said button and a second end engaging said second end of said cross rod.

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**4,303,267**

## FASTENING ARRANGEMENT ON THE SIDE OF THE BODY OF A BUMPER AT THE FRAME OF A MOTOR VEHICLE

**Fritz Häberle; Daniel Riechers, both of Sindelfingen, and Richard Heusel, Tübingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

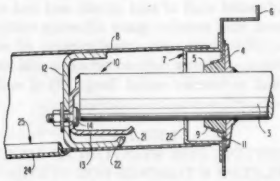
**Filed Apr. 14, 1978, Ser. No. 896,380**

**Claims priority, application Fed. Rep. of Germany, Apr. 16, 1977, 2716887; Sep. 10, 1977, 2740863**

**Int. Cl.³ B61F *19/04***

**U.S. Cl. 293—155** **18 Claims**

**1.** A fastening arrangement for fastening a bumper on an end of a body at a superstructure of a motor vehicle, the bumper including bumper parts to be fastened at a cross bearer connected with vehicle longitudinal bearers, said bumper parts having free ends extending into said longitudinal bearers, characterized in that the cross bearer and longitudinal bearers form a frame connection, a sleeve means forming a component of said cross bearer is provided for supporting said bumper parts at the frame connection, means extending over an entire height of said longitudinal bearers are provided for fixedly supporting



said free ends of the bumper parts at said longitudinal bearers, and in that means are provided for detachably connecting the free ends of the bumper parts to the supporting means including a curved member secured at each free end for receiving a fastening means for securing the curved member to its supporting means.

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**4,303,268**

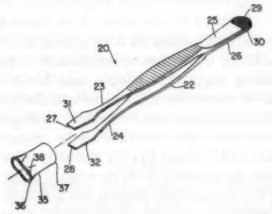
## METHOD AND APPARATUS FOR REMOVING EMBEDDED TICKS

**Harvey D. Davidson, P.O. Box 103, Orinda, Calif. 94563**

**Filed May 22, 1980, Ser. No. 152,363**

**Int. Cl.³ B65G *7/12***

**U.S. Cl. 294—16** **11 Claims**



**1.** Locking tongs which are especially useful for removing embedded ticks from the skin of a warm blooded host comprising a pair of cooperating longitudinally extending arms arranged in a generally side-by-side relationship, the said pair of arms having first and second end portions which include first and second terminal ends respectively, the said pair of arms being joined together on the said terminal ends of their second end portions and being progressively biased away from each other as they extend toward the said terminal ends of their first end portions whereby their said first end portions and the terminal ends thereof are normally spaced apart, the normally spaced said first end portions of the pair of arms being resilient whereby upon applying force thereto by squeezing the terminal ends thereof are moved together and whereby the said terminal ends are returned to their normally spaced relationship when the said force is no longer applied, the said terminal ends of the first end portions of the pair of arms including a pair of cooperating pressure applying members which are normally spaced apart a distance sufficient to receive the exposed body of an embedded tick whereby the exposed body of an embedded tick may be inserted therebetween and securely grasped by squeezing the said first end portions of the pair of arms to thereby force the said pair of pressure applying members together into a cooperating pressure applying relationship, an elongated locking sleeve having an opening extending longitudinally therethrough and first and second terminal end por-

tions, the locking sleeve being mounted on the said first end portions of the pair of arms, the locking sleeve being mounted whereby the said first end portions of the pair of arms extend through the said opening and the said pressure applying members are positioned outward from the said opening, the said first terminal end portion of the locking sleeve being adjacent the said pressure applying members and the said second terminal end portion of the locking sleeve being remote therefrom, the locking sleeve being slidably mounted on the said first end portions of the pair of arms whereby it is movable longitudinally therealong between first and second positions, first stop means defining the limit of movement of the locking sleeve toward the said pair of pressure applying members, the said first stop means including cooperating stop means carried by the said first terminal end portion of the locking sleeve and the said terminal ends of the first end portions of the pair of arms, the locking sleeve being rotatable on the said first end portions of the pair of arms when in the said first position, second stop means defining the limit of movement of the locking sleeve toward the said terminal ends of the second end portions of the pair of arms, the said second stop means including cooperating stop means carried by the said second terminal end portion of the locking sleeve and the first end portions of the pair of arms, the said second stop means also including means for varying the distance between the said pair of pressure applying members, the said pair of pressure applying members being normally spaced apart a maximum initial distance when the locking device is in the said first position and being moved progressively closer together as the locking sleeve is moved toward the said second position and being fully closed when the locking sleeve is fully in the said second position, the said second stop means also including means effective to retain the said pair of pressure applying members spaced apart at a desired distance varying from the maximum initial distance to the fully closed position, the said first terminal end portion of the locking sleeve having an oval cross-sectional configuration and the said second terminal end portion of the locking sleeve having a circular cross-sectional configuration, and the said maximum initial distance being variable by rotation of the locking sleeve while in the said first position whereby exposed bodies of embedded ticks of smaller and larger sizes may be positioned between the said pressure applying members and grasped therebetween upon sliding the locking sleeve toward the said second position.

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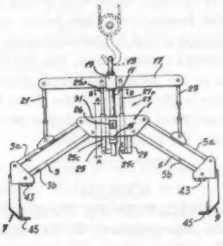
**4,303,269**

## LIFTING AND MATERIAL HANDLING APPARATUS

**Douglas Faughnan, 797 Edmond St., Hawkesbury, Ontario, Canada**

**Filed Dec. 10, 1979, Ser. No. 101,501**
**Int. Cl.³ B66C 1/10**
**U.S. Cl. 294—86 R** **12 Claims**



**1.** A lifting apparatus comprising:
a hinge block;
two lower arms extending from respective sides of the hinge block, each lower arm being pivotably connected to its respective side of the hinge block;
an opening arrangement including two rod-like means, each rod-like means being pivotably connected to a different one of said lower arms and arranged to either uniformly lift said lower arms, whereby to open said lower arms, or to lower said lower arms, whereby to close said lower arms;
a lifting rod having an attachment ring at the top end thereof, said lifting rod extending through both said opening arrangement and said hinge block;
means for connecting having three connecting positions, said means for connecting, in said first connecting position, connecting said lifting rod to said opening arrangement and, in said second connecting position, connecting said lifting rod to said hinge block, and, in the third connecting position, connecting both said hinge block and said opening arrangement to said lifting rod;
wherein, when said means for connecting is in said first position, said lower arms will open upon application of an upward force at said attachment ring due only to the action of gravity on said hinge block; and
wherein, when said means for connecting is in said second position, said lower arms will close due only to the action of gravity on said lower arms; and
wherein, when said means for connecting is in said third position, and said lower arms are open, said lower arms will remain open.

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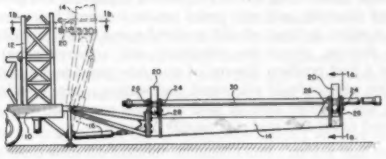
**4,303,270**

## SELF-CENTERING CLAMP

**Harold L. Adair, Rockwall, Tex., assignor to Walker-Neer Manufacturing Co., Inc., Wichita Falls, Tex.**

**Filed Sep. 11, 1979, Ser. No. 74,547**
**Int. Cl.³ B66C 1/42**
**U.S. Cl. 294—88** **10 Claims**



**1.** A self-centering clamp for clamping down-hole tubulars of various diameters, said clamp comprising:
first and second opposed clamping members;
means for guiding the first and second clamping members along a rectilinear clamping axis;
first hydraulically operated means for positioning the first clamping member along the axis, said first positioning means including a first hydraulic cylinder positioned to apply a first clamping force symmetrically to the first clamping member throughout the travel of the first clamping member;
second hydraulically operated means, opposed to the first positioning means, for positioning the second clamping member along the axis, said second positioning means including a second hydraulic cylinder positioned to apply a second clamping force symmetrically to the second clamping member throughout the travel of the second clamping member;
means for centering the first and second clamping members about a predetermined point on the clamping axis such that both clamping members remain substantially equidistant from the predetermined point as they are moved along the clamping axis by the first and second positioning means, respectively, and a down-hole tubular clamped between the first and second clamping members is centered at a predetermined position with respect to the guiding means;
said centering means comprising a first rack mounted to the first clamping member, a second rack mounted to the

second clamping member, and a pinion gear rotatably mounted to mesh with both the first and second racks such that movement of the first clamping member along the clamping axis causes the pinion gear to rotate, which in turn causes the second clamping member to move along the clamping axis, symmetrically with respect to the first clamping member.

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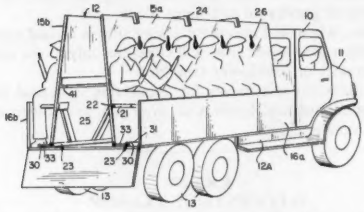
**4,303,271**

## MILITARY VEHICLE

**William J. H. Law, Port Chester, N.Y., assignor to AAL Enterprises, Inc., New York, N.Y.**

**Filed May 28, 1980, Ser. No. 153,960**
**Int. Cl.³ B60P *3/42***
**U.S. Cl. 296—10** **2 Claims**



1. A vehicle having a carrier body adapted for cargo-carrying and to transporting personnel, which includes an armored panel extending lengthwise of said body in approximately upright position, a side panel on said body located along said one side of said body on an exterior side of said armored panel, said side panel being pivotly mounted along the lower edge thereof whereby said side panel can be lowered from an upright position in front of said armored panel outwardly of said body portion, means for relocating said armored panel between a first position inward of said side panel and a second position adjacent said side panel, and seating means positioned along the exterior side of said armored panel between said armored panel and said side panel.

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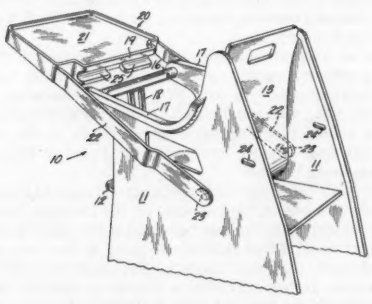
**4,303,272**

## CHILDREN'S HIGHCHAIR EQUIPPED WITH PLAY AND FOOD TRAY

**Tony Berggren, Skillinge, Sweden, assignor to Ifo Sanitar Aktiebolag Simrishamnsfabriken, Sweden**

**Filed Mar. 10, 1980, Ser. No. 128,944**
**Int. Cl.³ A47C *7/68***
**U.S. Cl. 297—153** **6 Claims**



1. A highchair equipped with a play and food tray; the highchair comprising two vertical sides including forward arms, the sides having a seat and a seat back therebetween, said arms and said tray having cooperating means for securing the tray in place near the forward ends of the arms, said tray including two side extension shafts projecting rearward, and cooperating locking means on each of said sides and each of said shafts remote from the tray for detachably connecting said shafts to said sides when said tray is secured in place by said cooperating means for securing, said locking means for detachably connecting said shafts comprising projections and holes cooperating to connect the sides and the shafts, said holes receiving the projections when the tray is fitted into operative position on the highchair with said tray located by said cooperating means for securing the tray in place, and said shafts being resilient and biased inwardly toward each other when the shafts are in place adjacent the sides of the highchair, whereby said projections locate in said holes when the holes and projections are aligned.

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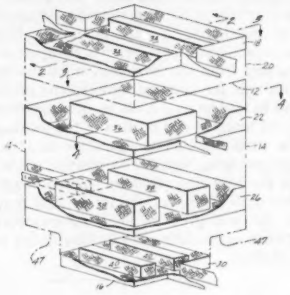
**4,303,273**

## IN SITU OIL SHALE RETORT WITH A GENERALLY T-SHAPED VERTICAL CROSS SECTION

**Thomas E. Ricketts, Grand Junction, Colo., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.**

**Division of Ser. No. 929,250, Jul. 31, 1978, Pat. No. 4,192,554.**
**This application Nov. 2, 1979, Ser. No. 90,561**
**Int. Cl.³ E21C *41/10***
**U.S. Cl. 299—2** **9 Claims**



1. An in situ oil shale retort containing a fragmented permeable mass of formation particles containing oil shale, the fragmented mass extending through a subterranean formation containing oil shale, a production level drift in communication with a lower portion of the fragmented mass at a production level for withdrawing liquid and gaseous products of retorting during retorting of oil shale in the fragmented mass, the principal portion of the fragmented mass being spaced vertically above a lower portion of the fragmented mass having a generally T-shaped vertical cross section, the lower portion of the fragmented mass at the production level having a horizontal cross-sectional area in the range of from about 30 to 70% of the horizontal cross-sectional area of an upper portion of the fragmented mass above the production level.

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**4,303,274**

## DEGASIFICATION OF COAL SEAMS

**Pramod C. Thakur, Morgantown, W. Va., assignor to Conoco Inc., Ponca City, Okla.**

**Filed Jun. 4, 1980, Ser. No. 156,300**
**Int. Cl.³ E21C *37/00***
**U.S. Cl. 299—12** **1 Claim**

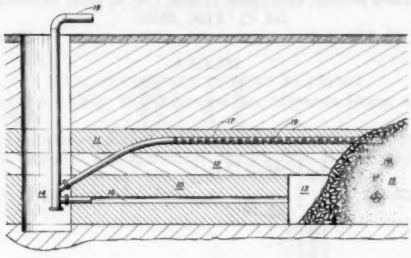
1. A method of degasifying a mineable coal seam which is overlain by a second coal seam comprising:

(a) forming a generally horizontal borehole in said second coal seam from a first location in an underground working

area to a second location over an unmined portion of said mineable coal seam;

(b) installing a perforated production pipe in said borehole;

(c) producing gas from said borehole;



(d) then mining said unmined portion of said mineable coal seam, and

(e) continuing to produce gas from said borehole as mining of said unmined portion of said mineable coal seam progresses.

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**4,303,275**

## SLIDEWAY MEANS AND EXCAVATING MACHINES COMPRISING SLIDEWAY MEANS

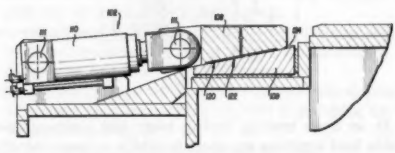
**Francis A. Haskew, and Leslie A. Jones, both of Burton-on-Trent, England, assignors to Coal Industry (Patents) Limited, London, England**

**Filed Nov. 30, 1979, Ser. No. 99,096**

**Claims priority, application United Kingdom, Dec. 15, 1978, 48635/78**

**Int. Cl.³ E21D *9/08***

**U.S. Cl. 299—31** **26 Claims**



1. Slideway means comprising a slideway component, a slide component guidably slidable with respect to the slideway component under the action of ram means, at least two wedge arrangements each carried by at least one of the components and further ram means for urging said two wedge arrangements to releasably wedge one of the components to the other of the components, the two wedge arrangements being mounted such that the two wedging actions associated with the two wedge arrangements respectively act in different angular directions when looking along the slideway component to inhibit relative movement between said components in a vertical and horizontal direction when looking along the slideway component.

**4,303,276**

## CONVEYOR CHUTE FOR CHAIN SCRAPER CONVEYORS

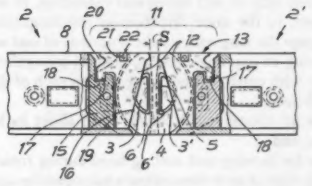
**Gert Braun, and Ernst Braun, both of Essen-Heisingen, Fed. Rep. of Germany, assignors to Halbach & Braun, Fed. Rep. of Germany**

**Filed Jan. 28, 1980, Ser. No. 116,234**

**Claims priority, application Fed. Rep. of Germany, Feb. 7, 1979, 2904525**

**Int. Cl.³ E21C *35/12***

**U.S. Cl. 299—43** **6 Claims**




1. A conveyor chute for chain scraper conveyors, comprising, a plurality of chute sections joined together with a clearance therebetween for free motion of one section in respect to the other, each section including a guide plank having a reinforcing plate portion adjacent an end thereof with an outstanding pin segment, a connecting plate interconnecting said segments having spaced apart eye openings therethrough into which a respective pin segment extends and with a web portion disposed between said pin segments, said eye openings and said pin segments being spaced apart by an amount to provide a clearance of motion between said sections, each of said sections comprising an auger tread plank of a box section configuration having an exterior wall covering said pin segments, an interior wall spaced from said exterior wall and said pin segments, said interior wall forming with said exterior wall a locking pocket adjacent the respective plank ends into which said connecting plate is located, said connecting plate having an exterior surface flush with the exterior surface of said exterior wall to form a tread bridge between adjacent sections.

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**4,303,277**

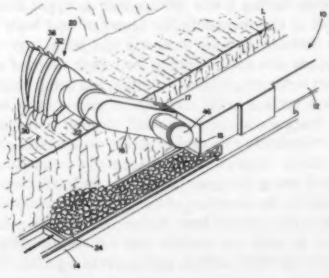
## TRIANGULAR SHAPED CUTTING HEAD FOR USE WITH A LONGWALL MINING MACHINE

**Wallace W. Roepke, Excelsior, and Sterling J. Anderson, Maple Grove, both of Minn., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.**

**Filed Feb. 6, 1980, Ser. No. 118,959**

**Int. Cl.³ E21 *27/24***

**U.S. Cl. 299—43** **5 Claims**



1. A longwall mining machine comprising:

a chassis movable parallel to and adjacent the longwall to be mined;

a boom pivoted at one end thereof to said chassis for movement of said boom in a vertical plane with respect to said chassis;

the opposite end of said boom carrying a rotatable cutting head with a longitudinal axis extending outwardly from the boom, said axis being, in an operative mode, generally parallel to the mining face to be cut and generally perpendicular to the direction of movement of the chassis;

said cutting head also comprising auger means cantilevered to one side of said boom and extending, in an operative mode, in the same direction as the longitudinal axis to engage the longwall, a helical portion of said auger means having an approximately equilateral triangular configuration with cutter bits being located on each of the apexes of said head;

means for rotating said cutting head about its longitudinal axis; and

means for moving said cutting head during rotation thereof such that its apex bits outline a substantially square trajectory normal to the longitudinal axis of said head;

whereby cut coal is removed laterally from said longwall in the direction of the head's longitudinal axis towards the chassis by said auger during the rotation of the cutting bits of said head.

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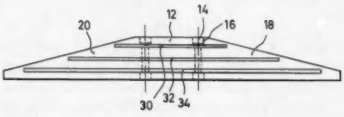
**4,303,278**

## ELASTIC BASE PLATE FOR TRACK CHAINS OF TRACK CHAIN TYPE VEHICLES

**Hermann Fehling, Beverstedt, Fed. Rep. of Germany, assignor to Hermann Fehling Tief-und Kulturbau, Beverstedt, Fed. Rep. of Germany**

**Filed Feb. 6, 1980, Ser. No. 118,872**
**Int. Cl.³ B62D *55/28***
**U.S. Cl. 305—35 R** **9 Claims**



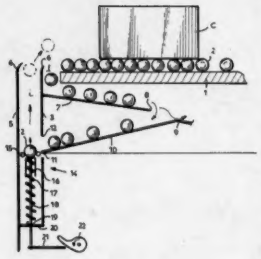

1. A base plate for track chains of a track chain type of vehicle, said base plate being for use on less favorable supporting soil and which is connectable to chain brackets of the track chain by bolts, said base plate comprising an elongated plate-like body having a sole surface and an upper side, a counter support at approximately the center of said body and having bores therethrough for receiving said bolts, lugs arranged on said upper side and extending from both dides of said counter support in the longitudinal direction and being chamfered from said sole surface in the direction of said counter support, said body being a one-piece moulded member comprised substantially completely of a rubber elastic crosslinked polyurethane, said counter support having a generally rectangular cross-section and being designed massively and said two lugs being bendable in the direction of the chain brackets, said base plate further comprising at least one one-piece insert which extends parallel to said sole surface and for substantially the entire length of said sole surface, said insert being made from a bendable elastic material whose bending modulus is significantly higher than that of the rubber elastic crosslinked polyurethane, and said insert being encased by said moulded polyurethane.

**4,303,279**

## INSTALLATION FOR HANDLING BY TABLE WITH BEARING BALLS

**Jean-Benoit Dussud, 12, rue Champ Rochas, 38240 Meylan, France**

**Filed Nov. 23, 1979, Ser. No. 96,915**
**Claims priority, application France, Dec. 4, 1978, 78 34102**
**Int. Cl.³ F16C *29/06***
**U.S. Cl. 308—6 C** **4 Claims**



1. Installation for handling a load comprising:

a table,

bearing balls which roll freely on the table,

a trough which extends along at least two edges of the table, and a distributor on which said trough opens downwards for distributing bearing balls which have fallen from the table into the trough said distributor being under the table, and

means for receiving the balls from the distributor and for returning them to the table.

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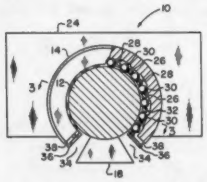
**4,303,280**

## OPEN ANTIFRICTION BEARINGS AND METHOD OF OPERATING THE SAME

**Ted Geffner, 310 Acre La., Hicksville, N.Y. 11801**

**Filed May 8, 1980, Ser. No. 147,759**
**Int. Cl.³ F16C *29/06***
**U.S. Cl. 308—6 C** **15 Claims**




1. In an open bearing having inner and outer relatively movable load applying members in which at least one of the load applying members is supported intermediate its ends and the other of the load applying members has an arcuate slot defined therein to enable its movement relative to the supported load applying member and to its support, said bearing comprising

retainer means movable between and arcuately relatively to the load applying members,

said retainer having an arcuate slot defined therein and aligned with the slot of the load applying member,

bearing elements between the load applying members and in rolling engagement therewith to support the load between and applied by the load applying members,

said bearing elements being retained by said retainer means between said load applying members for engagement therewith and for said arcuate movement relative to the

load applying members to enable said bearing elements to move in said retainer means and to change their arcuate positions of engagement with the load applying members, and means to limit the arcuate movement of said retainer means relative to the load applying members.

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**4,303,281**

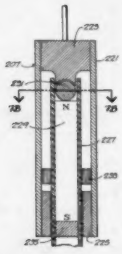
## MAGNETIC BALL THRUST BEARING

**Holcomb B. Irby, 1204 Kentwood Dr., Mountain Home, Ark. 72653**

**Continuation-in-part of Ser. No. 799,541, May 23, 1977, Pat. No. 4,166,488. This application Aug. 22, 1979, Ser. No. 68,660**

**Int. Cl.³ F16C *32/04, 19/10, 17/04***

**U.S. Cl. 308—10** **21 Claims**



7. An anti friction bearing comprising

a first bearing member of ferrous material with a hard surface,

a second bearing member with a hard surface spaced from said first bearing member with its said hard surface facing that of said first bearing member,

at least one rolling element positioned between said bearing members in contact with said hard surfaces thereof,

means for partially restraining the motion of said rolling element,

a magnetic flux source with two magnetic poles positioned to produce a magnetic flux through said rolling element and at least a portion of said bearing members, and

means for conducting magnetic flux from one of said bearing members to the more distant pole of said magnetic flux source to complete a substantially closed external flux path between the poles of said source,

said second bearing member having at least limited mechanically unconstrained freedom of movement toward and away from said first bearing member,

whereby the force to hold said bearing members in position in contact with said rolling element is provided by said magnetic flux source.

14. An anti friction bearing comprising

a first bearing member having a depression therein with a hard surface,

a second bearing member having a projection thereon with a hard surface spaced from said first bearing member with said projection extending into said depression,

a magnetic flux source with two poles positioned to produce a magnetic flux through said projection and portions of said bearing members, and

means for conducting magnetic flux from one of said bearing members to the more distant pole of said magnetic flux source to complete a substantially closed external flux path between the poles of said source,

whereby there is an attractive force tending to hold said bearing members together.

**4,303,282**

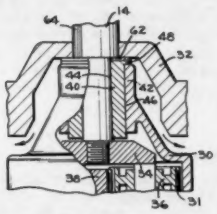
## FOOD PROCESSOR AND BEARING

**William M. Maher, Churchville, N.Y., assignor to General Electric Company, New York, N.Y.**

**Filed Apr. 4, 1980, Ser. No. 137,516**

**Int. Cl.³ F16C *1/24***

**U.S. Cl. 308—36** **6 Claims**



1. A food processor including a power unit in a base connected to drive a rotatable hub mounted on a vertically-oriented drive shaft extending into a removable bowl with cutting means on said shaft, the improvement comprising,

said shaft being step-fitted into a sleeve oil bearing carried from said base within the hub,

said bearing vertically and rotatably supporting and lubricating said shaft,

a radial extending flange on the top bearing end,

spaced channels in the inner and outer bearing surfaces extending from the top flange end to the lower sleeve end in said base,

circular oil collecting grooves in the upper and lower radial flange surfaces,

said grooves connected respectively to said inner and outer channels,

whereby oil migrating up the bearing surfaces is blocked from said bowl by collecting in said grooves and directed down said channels into the base.

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**4,303,283**

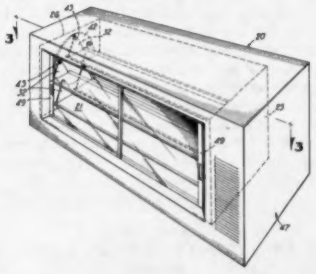
## DISPLAY CABINET WITH STABILIZED ROTATING SHELF MECHANISM

**Richard J. Mueller, 6155 Old Hickory Point, Atlanta, Ga. 30328**

**Filed May 13, 1980, Ser. No. 149,434**

**Int. Cl.³ A47B *49/00*; A47F *3/10***

**U.S. Cl. 312—135** **14 Claims**



1. A display cabinet for merchandise comprising a cabinet body, a rotational drive motor mounted on one wall of the cabinet body, a disc having circumferentially spaced openings drivingly coupled to said motor and being concentric with a drive shaft axis of the motor, a ring spaced axially of the disc and being eccentrically positioned relative thereto and having circumferentially spaced openings corresponding in number and spacing to the openings of the disc, crank links drivingly

interconnecting the disc and ring whereby rotation of the disc causes the ring to follow in rotation while maintaining its eccentric relationship to the disc, opposite side locator members for the ring in the cabinet body, circumferentially placed display shelves in the cabinet body spaced from one side of said disc and having corresponding ends fixedly attached to said crank links, and the spaced openings of said disc consisting of radial slots opening through the periphery of the disc, said locator members having opposing parallel grooves receiving peripheral edge portions of said ring, and opposing projecting flanges on said locator members having arcuate retainer edges preventing the escape of said crank links from said disc radial slots when said slots are substantially at three o'clock or nine o'clock positions on said disc during the rotation of the disc.

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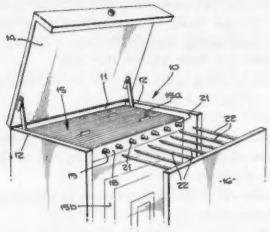
**4,303,284**

## INDEX GUIDE MEANS FOR A FILING SYSTEM

**Sigurd A. Johnson, Glendora, Calif., assignor to Plan Hold Corporation, Irvine, Calif.**

**Filed Mar. 27, 1980, Ser. No. 134,350**
**Int. Cl.[3] A47B *63/00*; B42F *21/00***
**U.S. Cl. 312—189** **3 Claims**



1. In a filing system provided with a plurality of laterally spaced means for supporting file material, each spaced support means having longitudinally separable support members for insertion and removal of file material, the provision of:

a plurality of multi-positionable one-piece file guide means adapted to be mounted on said support means in selected upward position there along for observeable indexing of material;

one of said file guide means being adapted to be arranged in one or more positions and comprising a flat planar strip element having a pair of holes for receiving a pair of support members,

a tab having oppositely directed faces for bearing indexing data extending laterally from one longitudinal edge portion opposite one of said holes,

and a second tab having oppositely directed faces for bearing additional indexing data extending laterally from the opposite longitudinal edge portion and from between said pair of holes whereby said strip element may be turned about its longitudinal axis for obtaining two tab upward positions in offset relation and may be turned about its lateral axis for obtaining a third upward position of one of said tabs.

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**4,303,285**

## COMBINATION TRASH RECEPTACLE AND CHOPPING BOARD

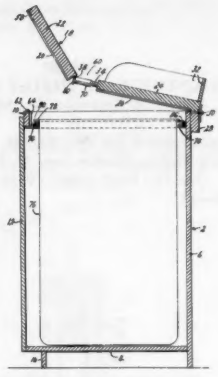
**Robert M. Wiegers, 6136 Lamar, Mission, Kans. 66202**

**Filed Aug. 19, 1980, Ser. No. 179,499**
**Int. Cl.[3] A47R *81/00*; B65R *67/00***
**U.S. Cl. 312—211** **9 Claims**

1. A combination trash receptacle and chopping board comprising:

a. a hollow cabinet,

b. a horizontal chopping board forming the top wall of said cabinet and being hinged to said cabinet at its rearward edge to open upwardly, and comprising a rear section, a front section normally smoothly abutting said rear section, and means connecting said front and rear sections and operable to permit planar movement of said front section relative to said rear section, whereby to open a slot there-



between through which access may be had to the interior of said cabinet, and

c. means operable to support a pliable trash bag in said cabinet with its open top disposed just below the slot opened in said chopping board by forward movement of the front board section.

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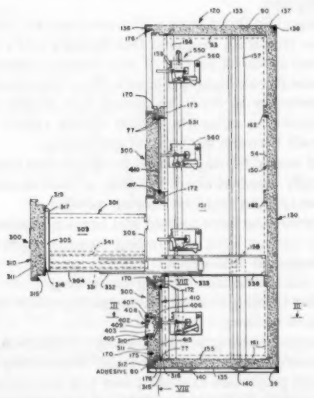
**4,303,286**

## INSULATED FILING CABINET

**Ralph E. McClellan, Toledo, Ohio, assignor to Meilink Industries, Inc., Whitehouse, Ohio**

**Filed Jan. 28, 1980, Ser. No. 115,676**
**Int. Cl.[3] A47B *88/00***
**U.S. Cl. 312—214** **25 Claims**



1. An insulated metal filing cabinet having a plurality of drawers, comprising:

(A) an outer metal shell of two side panels and a top panel with inner reverse flanges around their front edges and orthogonal reverse flanges around their rear edges, an inverted tray bottom whose sides are welded to the bottom edges of said side panels and a back panel having a flanged edge slidable into said orthogonal reverse flanges

around the rear edges of said two side panels and said top panel,

(B) a stepped metal jamb frame having a peripheral reverse flange seatable in said front inner reverse flange and held therein by an adhesive, said frame having a plurality of openings corresponding to the plurality of drawers in said cabinet, said openings being separated by tubular cross-members and said frame having keeper holes therein,

(C) an inner metal shell of a U-shaped piece forming top, back and bottom panels with flanges around their edges, said back panel having a plurality of spaced horizontal ledge channels, two side panels each having two parallel vertical ribs with lanced tabs, the edges of said side panels being welded to said flanges of said top, back and bottom panels of said U-shaped piece, and to the inner edges of said jamb frame, and

(D) a reinforced concrete insulation filling the space between said inner and said outer shells and said tubular cross-members of said jamb frame.

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**4,303,287**

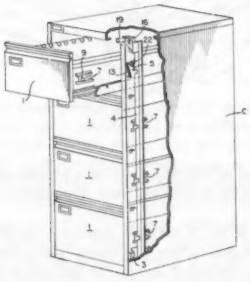
## LOCKING MECHANISM FOR A STORAGE CABINET

**John F. Taplin, Surrey, England, assignor to Vickers Limited, London, England**

**Filed Feb. 4, 1980, Ser. No. 118,318**

**Int. Cl.³ E05B *65/46*; E05C *7/06***

**U.S. Cl. 312—215** **8 Claims**



1. A storage cabinet assembly comprising a cabinet having side walls, a rear wall and a front frame formed with openings therein for the passage of at least two sliding drawers arranged one above the other to slide through said openings from shut positions within said cabinet to projecting open positions, at least two drawers mounted in said cabinet to slide between said shut and open positions, each said drawer having side walls and a front wall, vertical guide means fixed inside one side wall of said cabinet and extending over the adjacent side walls of said drawers, an upright locking bar displaceable in said guide means longitudinally of itself between upper and lower positions, one of which is a drawer-locking position and the other a drawer-releasing position, locking means on said locking bar and means on said adjacent side walls of said drawers cooperating with said locking means to lock each drawer only when in its shut position and when said locking bar is in its drawer-locking position, locking bar actuating means on each drawer for displacing said locking bar from its drawer-releasing position to its drawer-locking position during the initial part of the opening of the drawer to lock each remaining drawer shut, a spring having one end fixed with respect to said cabinet, means operatively connecting the other end of said spring to said locking bar whereby when said locking bar is moved from the drawer-releasing position to the drawer-locking position said spring passes through an over-centre position from a first state in which it ends to hold the locking bar in the drawer-releasing position to a second state in which is retains the locking bar in the drawer locking position, said means operatively connecting said other end of said spring to said locking bar comprising a mechanism which includes a lever arm, said other end of said spring being fixed to said lever arm at a point which undergoes augmented movement relatively to the movement of said locking bar during the displacement of said locking bar, said locking bar including a line of gear teeth thereon, said locking mechanism including a pinion pivoted about an axis fixed with respect to said cabinet and having its teeth engaged with said teeth on said locking bar, said lever arm being fixed to said pinion and the radius at which said point is located with respect to said axis being greater than the radius of said pinion, and further cooperating means on each said side wall of said drawers for returning said locking bar to its drawer-releasing position and said spring to its first state when a drawer is returned from its open position to its shut position.

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**4,303,288**

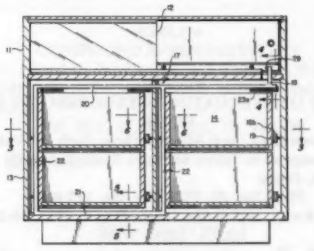
## DRAWER LOCKING APPARATUS FOR MERCHANDISE CABINETS

**William T. Aschinger, Gahanna, Ohio, assignor to The Columbus Show Case Company, Columbus, Ohio**

**Filed May 30, 1980, Ser. No. 154,789**

**Int. Cl.³ E05B *65/46***

**U.S. Cl. 312—215** **5 Claims**



1. In a merchandise cabinet which includes a first area provided with an access door and a second area provided with at least one drawer having a front surface facing outwardly of said cabinet, a drawer locking apparatus comprising:

(a) abutment means carried on said drawer and spaced inwardly from the front surface thereof;

(b) a rigid locking frame slidably mounted within the second area of said cabinet and movable laterally as a unit into and out of registry with said abutment means for selectively locking said drawer against opening movement; and

(c) a manually operable lever carried by said locking frame and extending into the first area of said cabinet in the path of movement of the access door, said lever being movable to shift said frame between drawer locking and unlocking positions.

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**4,303,289**

## STRUCTURAL COMPONENTS

**Terence Hardy, Belper, England, assignor to L.B. (Plastics) Limited, Belper, England**

**Filed May 9, 1979, Ser. No. 37,914**

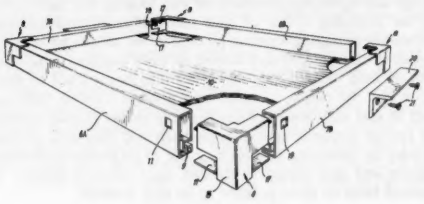
**Claims priority, application United Kingdom, May 13, 1978, 19450/78**

**Int. Cl.³ A47B *47/00*, *88/00***

**U.S. Cl. 312—330 R** **7 Claims**

1. A connecting member for use in interconnecting elongated structural components having openings in their ends, the connecting member including projecting spigot members adapted for engagement in said openings, retaining means for retaining the connecting member in engagement with the components, and a cover portion adapted to extend over portions of the outer surfaces of the interconnected components to conceal the joint between them, said retaining means comprising projecting detents provided on the inner surface of said

cover portion and engageable in complementary apertures in the structural components, the cover portion and/or the outer



surfaces of the components being flexible to enable engagement of the detents in the associated apertures.

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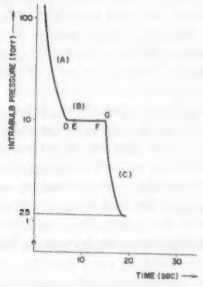
**4,303,290**

## METHOD OF EVACUATING A FLUORESCENT LAMP BULB

**Shinichi Tsunekawa, and Makoto Hojo, both of Yokohama, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Jan. 30, 1980, Ser. No. 117,835**
**Claims priority, application Japan, Feb. 2, 1979, 54-11278**
**Int. Cl.³ H01J** *9/395*
**U.S. Cl. 316—20** **3 Claims**




1. A method of evacuating a fluorescent lamp bulb comprising:

a first decompression step of decompressing a fluorescent lamp bulb, on the inner wall of which a fluorescent layer is deposited, and both ends of which are provided with an electrode and are are connected to first and second evacuation tubes, to a pressure level higher than a prescribed final seal pressure through the first evacuation tube;

a flow step of, while maintaining the intrabulb pressure at the level attained in the first decompression step, introducing a desired gas into the bulb through the second evacuation tube and expelling the gas through the first evacuation tube to fill the bulb with said gas at said pressure level; and

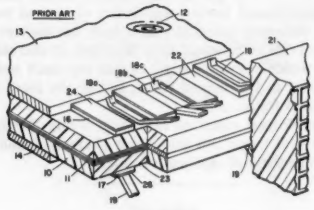
a second decompression step of decreasing the intrabulb pressure from the level attained in the first decompression step to the prescribed final seal pressure.

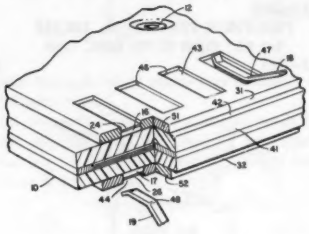
**4,303,291**

## METHOD OF SEATING CONNECTOR TERMINALS ON CIRCUIT BOARD CONTACT PADS

**David R. Dines, Oklahoma City, Okla., assignor to Western Electric Company, Inc., New York, N.Y.**

**Filed Nov. 24, 1980, Ser. No. 210,073**
**Int. Cl.³ H05K** *1/00*
**U.S. Cl. 339—17 B** **9 Claims**



1. A method of forming seats on a printed wiring board to receive terminals extending from a connector, which comprises:

forming a series of parallel contact pads along one edge section of one surface of printed wiring board, and

applying an insulating layer over said one surface with sections of said layer extending as fillets between said contact pads, said fillets being thicker than the thickness of said contact pads to form recessed seats to receive the terminals.

2. A method of fabricating a printed circuit board, which comprises:

forming a circuit board with circuits running to contact paths extending in spaced relation along one marginal edge of the board;

placing a photosensitive layer of insulating material over the contacts and the spaces therebetween, and said layer being at least as thick as the height of the contact pads; and p1 developing the photosensitive layer to form insulating fillets in the spaces between the contact pads, the heights of which are at least equal to the heights of the contact pads.

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**4,303,292**

## MULTIPLE PIN CONNECTOR FOR MULTIPLE CONDUCTOR CABLE

**William O. McNeel, Houston, Tex., assignor to GEO Space Corporation, Houston, Tex.**

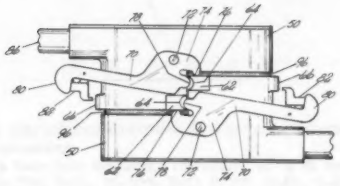
**Filed Nov. 5, 1979, Ser. No. 91,072**
**Int. Cl.³ H01R** *13/629*
**U.S. Cl. 339—45 M** **14 Claims**

1. A multiple pin connector for a multiple conductor cable comprising

a housing having a face plate, a hollowed-out central area and means defining a passageway to enable a multiple

conductor cable to extend from the hollowed-out central area to the exterior of the housing, said housing including means for defining a raised "U-shaped" collar around the periphery of one end of the face plate and with each collar end of the "U-shaped" collar terminating at the center of the face plate, each of said "U-shaped" collar ends terminating in a differential locking boss having a keyway extending toward the other end of the face plate and a clamping lip located on the exterior at the center of the "U-shaped" collar;

a pair of inserts positioned in said face plate and extending from the exterior of the face plate into the hollowed-out central area, each of said inserts including at least one of a plurality of elongated male connectors and a plurality of elongated female connector sockets, said elongated male connectors and elongated female connector sockets extending substantially perpendicular from the face plate surface into the hollowed-out central area, said pins and sockets being arranged in each of said first and second inserts in a parallel spaced relationship and in an identical pattern to form a hermaphrodite connector; and



a stirrup interconnector having at one end thereof bifurcated locking arms, each terminating in a differential locking member formed of a key and a cam, and the other end of the stirrup interconnector terminating in a releasable clamping member, said stirrup interconnector being positioned to receive the housing between the bifurcated locking arms with the "U-shaped" collar and clamping lip located adjacent the releasable clamping member, each differential locking member being pivotally mounted to the housing to afford rotation of the stirrup interconnector therearound, said stirrup interconnector being adapted to rotate around the pivotal mountings to position the releasable clamp in clamping engagement with the clamping lip when the stirrup interconnector is rotated into a locking position and to position the releasable clamp in disengagement from the clamping lip when the stirrup interconnector is rotated into a release position, each of said differential locking members being adapted to cooperate with a differential locking boss on an identical connector with the keys on one connector received in the keyways of the other connector to hold them in locked assembly and the cams located to aid in connector separation.

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**4,303,293**

## CONNECTION FOR ELECTRODES

**Davor Grunwald, Winnipeg, Canada, assignor to Harco Electronics Limited, Winnipeg, Canada**

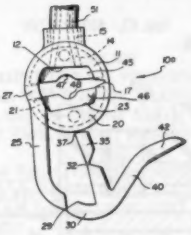
**Filed Feb. 8, 1980, Ser. No. 119,676**
**Claims priority, application Canada, Oct. 17, 1979, 337819**
**Int. Cl.³ H01R *4/48***
**U.S. Cl. 339—61 M** **33 Claims**

1. An electrode clip formed of resilient plastic material comprising:

a fixed jaw, and a movable jaw pivotally urgeable towards the fixed jaw, said jaws including a pair of cooperating female electrical contacts;

an operating mechanism composed of a plurality of interconnected elements and including at least two living hinges, one of the elements being integrally secured to said movable jaw by a living hinge;

and a lever secured to said operating mechanism for operating on said operating mechanism for positively urging said movable jaw towards said fixed jaw;



thereby to urge said jaws to a closed position and simultaneously to force one said living hinge to an over-toggle position, and thus to lock said jaws in said closed position.

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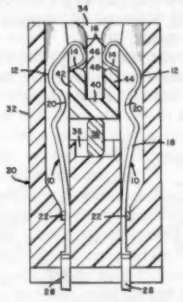
**4,303,294**

## COMPOUND SPRING CONTACT

**Wilbur A. Hamsher, Jr., Carlisle, and Robert N. Weber, Hummelstown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Mar. 17, 1980, Ser. No. 130,759**
**Int. Cl.³ H01R *13/62***
**U.S. Cl. 339—74 R** **9 Claims**



1. An electrical terminal for a zero insertion force connector, the terminal which is in the form of a strip of resilient sheet metal stock, comprising a contact spring portion at one end, a mounting part at the opposite end, and a spring beam part intermediate the contact spring portion and the mounting part, the contact spring portion having a contact surface and an abutment surface to which a force can be applied lengthwise of the terminal resiliently to deflect the spring beam part and the contact spring portion relative to the mounting part, when the mounting part is fixedly positioned in a support; the contact spring portion being so formed that upon the initial application of the force to the abutment surface, in the lengthwise direction of the terminal, the contact spring portion is deflected relative to the spring beam part prior to the spring beam part being deflected relative to the mounting part, whereby upon cessation of the force, the contact spring portion returns towards its initial position along such a return path that the contact surface wipes along an electrical conductor when such is positioned so as to intersect the return path of the contact surface.

**4,303,295**

## CONNECTOR FOR ELECTRIC CABLES

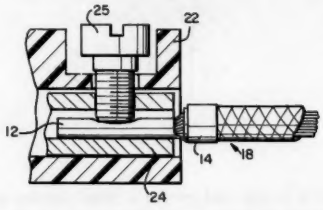
**Felix Schreder, Oberderdingen, Fed. Rep. of Germany, assignor to E.G.O. Elektro-Gerate Blanc u. Fischer, Oberderdingen, Fed. Rep. of Germany**

**Filed Dec. 11, 1979, Ser. No. 102,502**

**Claims priority, application Fed. Rep. of Germany, Dec. 18, 1978, 7837478[U]**

**Int. Cl.³ H01R** *4/36*

**U.S. Cl. 339—92 R** **13 Claims**




1. A sheet metal connector for the end of an electric cable having a wire conductor, the connector comprising:

a first connecting end portion surrounding the end of the conductor and forming an end sleeve;

a portion extending laterally from the first connecting end portion; and,

an arm extending from the lateral portion and forming a second connecting end portion substantially parallel to the first connecting end portion, the arm and the lateral portion forming an L-shaped projection.

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**4,303,296**

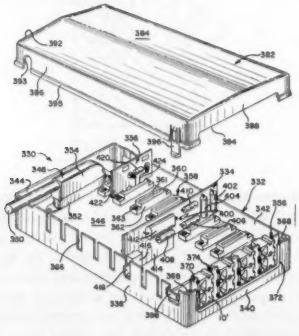
## MODULAR INTERFACE CONNECTOR

**Tedford H. Spaulding, Norridge, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.**

**Division of Ser. No. 902,330, May 3, 1978, Pat. No. 4,239,316. This application Dec. 26, 1979, Ser. No. 107,309**

**Int. Cl.³ H04M** *9/00*

**U.S. Cl. 339—122 R** **20 Claims**



1. A connector assembly for electrically connecting at least one first multi-conductor cable to a plurality of conductors electrically coupled to telephone signal equipment, each said cable terminating in a first modular connector component having a first plurality of contact elements, said assembly comprising:

an enclosure defined by a plurality of wall members;

a removable support member disposed within said enclosure and including spaced mounting shoulders;

at least one second modular connector component slidably mountable in said support member at any selected position between said shoulders, each said second connector component including a housing having an aperture therein and side wall means defining a cavity for receiving one said first connector component and a second plurality of contact elements having active contact portions projecting into said cavity for engagement with said first plurality of contact elements when said first connector component is inserted into said cavity through said aperture, first mounting means disposed on opposite side walls of said housing for mounting said housing on said support member between said shoulders wherein the central axis of said cavity normal to said aperture is aligned in a first direction relative to the plane defined by said shoulders, and second mounting means disposed on opposite side walls of said housing for mounting said housing on said support member between said shoulders wherein said central axis is aligned in a second direction relative to said plane and at an angle to said first direction; and

circuit means for electrically connecting each said second plurality of contact elements to selected ones of said plurality of conductors coupled to telephone signal equipment.

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**4,303,297**

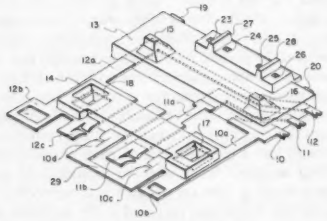
## SOCKET STRUCTURE FOR ELECTRICAL COMPONENTS

**David C. Smart, Penfield, and Paul F. Black, Dansville, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 26, 1980, Ser. No. 134,043**

**Int. Cl.³ B29C** *24/00;* **H01R** *13/506, 13/514*

**U.S. Cl. 339—218 M** **5 Claims**



1. A socket for at least one electrical component having conductive leads, said socket comprising:

(a) a plurality of metal conductor straps, each defining a lead-gripping structure;

(b) two molded plastic body members outsert molded to said conductor straps while said conductor straps and said body members are substantially coplanar with one another, said body members being spaced apart and joined by portions of said conductor straps that are bendable between said body members to provide a hinge structure that allows mutually facing surfaces of said body members to be positioned in confronting abutment with one another; and

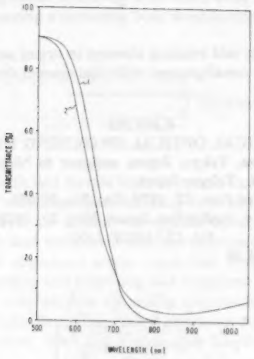
(c) means defining guide holes in one of said body members for receiving the leads of said electrical component and for aligning said leads for engagement by respective ones of said lead-gripping structures.

**4,303,298**

## NEAR INFRARED ABSORPTION FILTER FOR COLOR TELEVISION CAMERAS

**Toshiharu Yamashita, Hachioji, Japan, assignor to Hoya Corporation, Tokyo, Japan**

**Filed Mar. 13, 1979, Ser. No. 20,138**
**Claims priority, application Japan, Apr. 17, 1978, 53/45089**
**Int. Cl.³ G02B *5/22***
**U.S. Cl. 350—1.1** **6 Claims**




1. A near infrared absorption filter for color television cameras, comprising

(a) a base glass consisting essentially of, in % by weight, 50–75% $P_2O_5$, 10–50% BaO, 0–7% $Al_2O_3$, 0–6% $B_2O_3$, 0–5% $SiO_2$, 0–8% $Li_2O$, 0–15% $Na_2O$, 0–18% $K_2O$, 0–5% MgO, 0–10% CaO, 0–15% SrO, 0–10% ZnO, and 0–10% PbO, and

(b) about 0.5 to about 2.5% by weight of CuO based on the weight of the base glass,

(c) and wherein the total amount of said BaO and at least one of said $Li_2O$, $Na_2O$ and $K_2O$ is 25–45% by weight.

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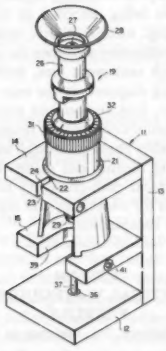
**4,303,299**

## HAND-HELD INSTRUMENT FOR INSPECTING DRILL BITS

**Gary R. Clark, 2965 Cohansey Dr., San Jose, Calif. 95132**

**Filed May 21, 1979, Ser. No. 40,506**
**Int. Cl.³ G02B *21/24***
**U.S. Cl. 350—90** **4 Claims**



1. A hand-held instrument for inspecting a drill bit, comprising: a stand of transparent material, microscope means mounted on the stand, and means forming a socket in the stand for receiving the shank of the drill bit and holding the bit only by the shank, the tip of the bit being free of any supporting structure and in position to be viewed through the microscope means when the instrument is held up to the eye of the user.

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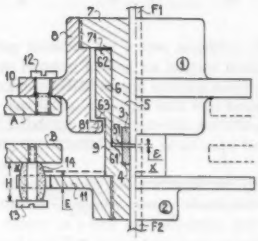
**4,303,300**

## ROTARY-JOINT DEVICE PROVIDING FOR AN OPTICAL WAVEGUIDE TRANSMISSION

**Robert Pressiat; Guy de Corlieu; Marcel Malard, and Luigi d'Auria, all of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Feb. 4, 1980, Ser. No. 118,001**
**Claims priority, application France, Feb. 7, 1979, 79 03136**
**Int. Cl.³ G02B *5/14***
**U.S. Cl. 350—96.20** **7 Claims**



1. A rotary-joint device providing for an optical waveguide transmission between two bodies which are relatively rotatable about a common axis of rotation comprising:

a male ferrule with a cylindrical portion and a female ferrule with an internally bored cylindrical portion having a diameter substantially equal to the diameter of the cylindrical portion of the male ferrule to form a shaft rotatably mounted within a sleeve with a close but compliant fit therebetween permitting rotational displacement and relative axial displacement.

one end of optical waveguide conductors placed along an axis of the ferrules to ensure that corresponding end faces of the optical waveguide conductors are disposed in opposed parallel relation centered on the axis,

an abutment device for limiting displacement along the axis of the sleeve and controlled by the ferrules utilized,

means for mechanically coupling the ferrules respectively to said bodies so as to permit rotational motion of said ferrules about said axis,

a rigid assembly for the coupling means coupling one of the ferrules to one of the external bodies,

a semi-rigid assembly for coupling the other ferrule to the other body,

resilient means for the abutment device for extending a pressure on the sleeve and bringing the sleeve to an abutment position corresponding to a minimum value of interface between the optical wa .eguide conductors, and

means for lubricating contacting surfaces during rotation and entailing use of a liquid having a refractive index adapted to optical coupling within the interface and sealing elements,

whereby the rotary joint is isolated from variations in relative positioning of the two bodies as a result of mechanical play, centering and optical coupling is maintained for the optical waveguide conductors notwithstanding any axial displacements and defects in misalignment and off-center displacement arising during rotation between the ferrules.

**4,303,301**

## CABLE COUPLING FOR ELECTRICAL CURRENT LINES AND LIGHT CONDUCTORS

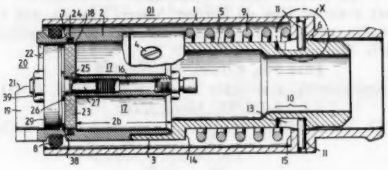
**Heinrich Teichert, Gondelsheim, and Bruno Pfatteicher, Pfinztal, both of Fed. Rep. of Germany, assignors to Fabeg GmbH, Bretten, Fed. Rep. of Germany**

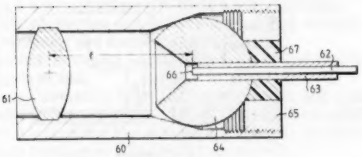
**Filed May 30, 1980, Ser. No. 155,133**

**Claims priority, application Fed. Rep. of Germany, Jun. 1, 1979, 2922937**

**Int. Cl.³ G02B *7/26***

**U.S. Cl. 350—96.18** **18 Claims**





1. In a cable coupling for automatically coupling through conductors carrying electrical heating and/or control current lines between vehicles which are mechanically coupled together in a detachable manner, which coupling includes a contact box on each vehicle, each contact box containing a carrier carrying at least one electrical connector, with associated connectors in contact boxes on two vehicles coming into engagement with one another during or after mechanical coupling of the vehicles, the coupling further including optical fiber couplers for automatically coupling together optical fibers for the transmission of information, the improvement wherein each optical fiber coupler comprises a replaceable insert mounted in a respective carrier to be pivotable over a limited range in all directions relative to said carrier, and each said insert includes: a member for holding the ends of a plurality of optical fibers in precise parallel alignment with one another and for holding, at the end of each such optical fiber, a lens element causing light emanating from the fiber to diverge; a glass pane disposed for passively protecting the associated lens elements; and means for actively protecting said pane against moisture, fogging and dust.

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**4,303,302**

## PIEZOELECTRIC OPTICAL SWITCH

**Hubert J. Ramsey, Burlington, and Mark L. Dakss, Sudbury, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Oct. 30, 1979, Ser. No. 89,709**

**Int. Cl.³ G02B *5/14***

**U.S. Cl. 350—96.20** **9 Claims**

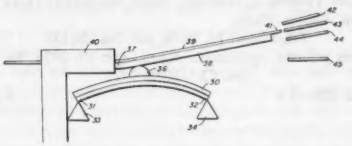
1. In combination,

a piezoelectric bending element having one end fixed in position, having an opposite end free, and adapted to be piezoelectrically bent along an axis joining said one end and said opposite end;

a first optical fiber affixed with its axis along said axis of said bending element;

a second optical fiber in general proximity to, and adapted to be aligned with, said first optical fiber; and

means for applying a first voltage to cause said bending element to orient said first optical fiber in alignment with said second optical fiber, and for applying a second voltage to cause said bending element to orient said first optical fiber in nonalignment with said second optical fiber.



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**4,303,303**

## MECHANICAL OPTICAL SWITCHING DEVICE

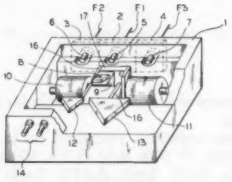
**Tsutomu Aoyama, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan**

**Filed Nov. 27, 1979, Ser. No. 97,648**

**Claims priority, application Japan, Nov. 29, 1978, 53-147620**

**Int. Cl.³ G02F *1/00***

**U.S. Cl. 350—96.20** **11 Claims**



1. A mechanical optical switching device comprising: an input receptacle means having an input optical fiber mounted therein; first and second output receptacle means, each having an output fiber mounted therein for selectively giving an output signal responsive to an input light beam transmitted over an optical fiber in said input receptacle means; input lens means associated with said input receptacle for collimating said input light beam; first optical path-changing means having two surfaces for reflecting the light beam passing from said input optical fiber and through said input lens, said first optical path-changing means being disposed in the optical oath and at the rear of said input lens; second optical path-changing means having two reflecting surfaces for reflecting the light beam from said first optical path-changing means, said second optical path-changing means being disposed at the rear of said first optical path-changing means; third optical path-changing means having two reflecting surfaces for reflecting the light beam passing through said input lens, said third optical path changing means being disposed at the rear of said first optical path-changing means; first and second output lenses disposed in front of said first and second output receptacles for converging said light beams after passing through said second and third optical path-changing means; and means for inserting or removing said first optical path-changing means in the optical axis of said input lens for switching said input light beam from between said output receptacles.

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**4,303,304**

## UNIVERSAL OPTICAL WAVEGUIDE ALIGNMENT FERRULE

**Frank A. Ruiz, Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Nov. 30, 1979, Ser. No. 99,110**

**Int. Cl.³ G02B *5/14***

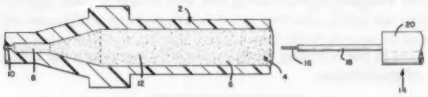
**U.S. Cl. 350—96.20** **5 Claims**

1. A ferrule for terminating an optical waveguide having a center core, an intermediate cladding layer surrounding the

core, and an outer sheath surrounding the clad core, said ferrule comprising:

a ferrule body of generally truncated conical profile having a profiled passageway therethrough from a cable receiving rearward passageway portion to a forward bore dimensioned to allow a clad portion of the optical waveguide core therethrough;

said ferrule body having radially compressible and removable alignment means at a forward end, said alignment means having a centering bore therethrough in communi-



cation with said ferrule body bore and located on the axis of said body bore, said centering bore being dimensioned to receive an unclad waveguide core portion therethrough with clearance, whereby upon radially compressing said alignment means upon said unclad waveguide core portion, and removing said alignment means and said unclad core portion extending therethrough, a forward face of said waveguide core is presented on the axis of said ferrule body bore and having said cladding layer thereabout.

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**4,303,305**

## REFLEX REFLECTOR DEVICE

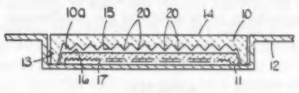
**Kenneth J. Jones, Sutton Coldfield, England, assignor to Lucas Industries Limited, Birmingham, England**

**Filed Apr. 29, 1980, Ser. No. 144,817**

**Claims priority, application United Kingdom, Oct. 16, 1979, 35911/79; Nov. 8, 1979, 38779/79; May 4, 1980, 15530/79**

**Int. Cl.³ G02B *5/124***

**U.S. Cl. 350—103** **11 Claims**



1. A reflex reflector device comprising a first reflex reflector having (1) a front surface, and (2) a rear surface provided with a plurality of corner cube reflecting elements, and a second reflex reflector disposed behind said first reflex reflector, said second reflex reflector having (1) a front surface and (2) a rear surface provided with a plurality of corner cube reflecting elements which have a linear size less than that of said corner cube reflecting elements of said first reflex reflector, said front surface of said second reflex reflector being disposed between said corner cube reflecting elements of said rear surfaces of said first and second reflex reflectors, whereby a light ray from a predetermined direction which is incident upon said front surface of said first reflex reflector and which passes through said first reflex reflector to enter said second reflex reflector via said front surface thereof is reflected by faces of one of said corner cube reflecting elements of said second reflex reflector so as to return in a direction substantially parallel to that at which it entered said second reflex reflector.

**4,303,306**

## LENS ASSEMBLY

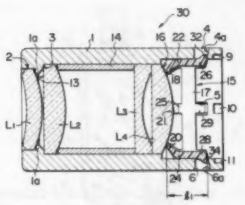
**Kaneyas Ookawa, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Japan**

**Filed Mar. 3, 1980, Ser. No. 126,660**

**Claims priority, application Japan, May 31, 1979, 54/74288[U]**

**Int. Cl.³ G02B *7/02***

**U.S. Cl. 350—252** **8 Claims**



1. A lens fixing member for a lens assembly of the type comprising a lens housing having an interior surface, and at least one lens accommodated in said housing and held in place therein by said lens fixing member, said lens fixing member being formed of a flexible plastic material and comprising:

a generally cylindrical body having an axis and having a first and a second end;

a first group of projections integral with and circumferentially approximately equally spaced about said body, and oriented to extend in a first axial direction and to project axially beyond said first end of said body in said first axial direction for engaging one surface of a lens; and

a second group of projections integral with said body, equal in number to and axially aligned with respective ones of said first group of projections, and oriented to extend generally in a second axial direction opposite said first axial direction for engaging the interior surface of said housing.

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**4,303,307**

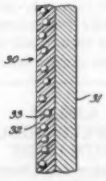
## COPY SECURITY SYSTEM

**Al Tureck, 3728 West Enfield, Skokie, Ill. 60076, and Theodore P. Gordon, 555 Cornelia, Chicago, Ill. 60657**

**Continuation-in-part of Ser. No. 845,851, Oct. 27, 1977, abandoned. This application Oct. 24, 1979, Ser. No. 87,667**

**Int. Cl.³ G02B *27/00*; B42D *15/00***

**U.S. Cl. 350—276 R** **4 Claims**



1. A copy-resistant document for precluding the unauthorized copying of said document on copying apparatus having light-producing elements and receiving elements for receiving light reflected from said document, said document comprising:

a supporting substrate including a dielectric layer formed of an electrically non-conducting material;

a plurality of generally spherical particles formed of an electrically conducting material embedded within said dielectric layer, said particles being operable to forwardly scatter light and divert the transmission of the reflected light away from said receiving elements, said particles

being spherical and having a diameter of the order of 1.2 microns.

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**4,303,308**

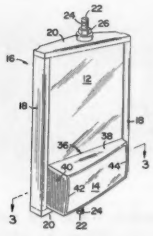
## REAR VIEW MIRROR

**Hy H. Kobrin, 6840 NW. 10th Dr., Margate, Fla. 33309**

**Filed Feb. 27, 1980, Ser. No. 125,145**

**Int. Cl.³ B60R *1/08*; G02B *5/10***

**U.S. Cl. 350—303** **8 Claims**




1. A rear view mirror assembly, comprising: a planar mirror means of predetermined dimensions, a convex mirror means disposed in angular orientation relative to said planar mirror means so that one end of said convex mirror means is substantially co-planar with the plane of said planar mirror means, said end disposed remotely from a driver of a vehicle and so that said convex mirror means diverges outwardly from the plane of the planar mirror means as said convex mirror means extends to a position proximate to the driver of the vehicle, said planar mirror means and said convex mirror means disposed adjacent one another so that the driver of the vehicle can observe both mirrors substantially simultaneously, a convex mirror housing means for retaining said convex mirror means in said angular disposition, said convex mirror housing means comprisisng a generally rectangular housing means having opposed tapered side walls and a pair of opposed end walls orthogonally disposed relative to said side walls for interconnecting the opposed ends of said tapered side walls; the amount of taper of said side walls defining the specific angular orientation of said convex mirror means relative to the plane of said planar mirror means, said convex mirror housing means further comprises an inwardly directed peripheral flange means formed in the outer edges of said tapered side walls and a plurality of circumferentially spaced inwardly directed shelf means for supporting the peripheral edges of said convex mirror means, said flange and said shelf means collectively retaining said convex mirror means in sandwiched relation therebetween, said convex mirror housing further comprises a pair of opposed outwardly projecting tab means disposed adjacent said end walls to secure said convex mirror housing assembly in said rear, view mirror assembly.

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**4,303,309**

## CONTINUOUS HIGH SPEED MODULATION OF LIGHT WITH LIGHT

**Lawrence C. West, 774 Joyce St., Livermore, Calif. 94550**

**Filed Jul. 20, 1979, Ser. No. 59,324**

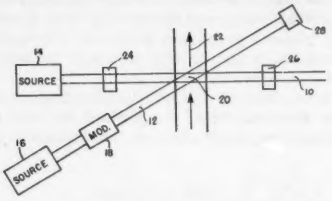
**Int. Cl.³ G02B *5/23***

**U.S. Cl. 350—354** **19 Claims**

1. A method for increasing the speed of modulation of light with light in a coupling medium that enables a controlling light beam directed at the coupling medium to control passage of a controlled light beam through the medium, the speed of modulation being limited by the rate of heat dissipation in the medium, comprising:

directing a controlling light beam and a controlled light beam to an interaction region of the coupling medium; and

advectively cooling the coupling medium by continuously flowing the coupling medium through the interaction region at least partly transversely to the controlling and controlled light beams to increase the rate of heat dissipation in the coupling medium, thereby increasing the speed of modulation.

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**4,303,310**

## ELECTROCHROMIC DISPLAY DEVICE

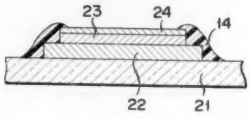
**Hiroshi Morita, Machida, and Hiroshi Washida, Yokohama, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Jun. 4, 1979, Ser. No. 45,334**

**Claims priority, application Japan, Jun. 5, 1978, 53-66689**

**Int. Cl.³ G02F *1/17***

**U.S. Cl. 350—357** **13 Claims**




1. An electrochromic display device comprising:

a display electrode;

an electrochromic coloring layer formed on the display electrode to constitute a display section and having a first surface portion in contact with the display electrode and a second surface portion;

a counter electrode spaced from the display electrode; and

an electrolyte within the space between the display section and the counter electrode, the electrolyte being in contact with the second surface portion of the electrochromic coloring layer;

the second surface portion of said coloring layer which contacts the electrolyte having a higher density than that of the remaining portion of the electrochromic coloring layer.

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**4,303,311**

## SHORT DISTANCE ZOOM LENS SYSTEM

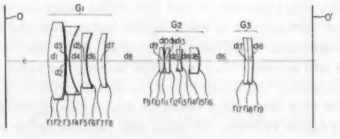
**Soichi Nakamura, Kamakura, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan**

**Filed Aug. 27, 1979, Ser. No. 70,102**

**Claims priority, application Japan, Aug. 29, 1978, 53-104471**

**Int. Cl.³ G02B *15/18***

**U.S. Cl. 350—427** **6 Claims**




1. A short distance zoom lens system for forming an image at a predetermined short distance from the lens system of an object lying at another short distance from the lens system, the

zoom lens system consisting of, in order from the object side, a divergent first lens group, a convergent second lens group, and a divergent third lens group, said divergent first lens group comprising one positive lens component and two negative lens components, said convergent second lens group comprising one negative lens component and two positive lens components separated from said negative lens component, and said divergent third lens group comprising one negative lens component, and wherein said convergent second lens group and said divergent third lens group are movable relative to each other along the optical axis for effecting a magnification change, said divergent first lens group being stationary during the magnification change and being movable along the optical axis independently of said second and third groups in accordance with the distance to the object.

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**4,303,312**

## PHOTOGRAPHIC OBJECTIVE OF CONTINUOUSLY VARIABLE FOCAL LENGTH

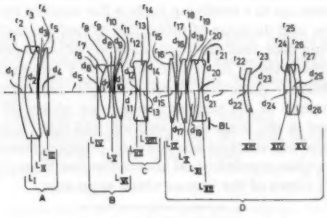
**Heinrich Basista, Königsbronn, Fed. Rep. of Germany, assignor to Carl Zeiss-Stiftung, Fed. Rep. of Germany**

**Filed Jan. 14, 1980, Ser. No. 112,045**

**Claims priority, application Fed. Rep. of Germany, Jan. 12, 1979, 2900977**

**Int. Cl.³ G02B *15/18***

**U.S. Cl. 350—427** **3 Claims**



1. Photographic objectives of continuously variable focal length, consisting of four lens-groups the first of which (A) is of converging, the second (B) of diverging, the third (C) of diverging, and the fourth (D) of converging refractive power, the change in the focal length of the objective being effected in the manner that the two diverging lens groups (B,C) are displaced along the optical axis relative to each other and relative to the two converging lens groups (A,D), the two diverging lens groups (B,C) consisting together of at least four members at least one of which members has a chromatically acting cemented surface, characterized by the fact that the refractive powers of the movable lens groups (B,C) are so distributed that the variable air space ($d_{14}$) present between the lens groups (C) and (D) is larger in the wide-angle position than in any other focal-length postion and is smaller in amount by a factor of 0.3 than the shortest focal length ($f_1$) of the objective, and that the fourth multilens lens group (D) contains in the front part, consisting of the lenses IX to XII at least one laminated member whose cemented surface is of negative refractive power, and that this laminated member is followed, at a distinct distance from it, by a diverging meniscus (lens XIII) whose concave surface is curved towards the image plane and whose focal length is larger in amount by at least a factor of 3 and at most a factor of 5 than the longest focal length ($f_3$) of the objective.

**4,303,313**

## PHOTOGRAPHIC LENS SYSTEM

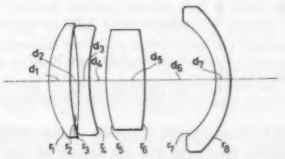
**Toshihiro Imai, and Hiroshi Takase, both of Hachiouji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Nov. 27, 1979, Ser. No. 97,664**

**Claims priority, application Japan, Nov. 28, 1978, 53/146001**

**Int. Cl.³ G02B *9/34***

**U.S. Cl. 350—456** **6 Claims**



1. A photographic lens system comprising a first lens component of a meniscus positive lens with its convex surface on the object side, a second lens component of a biconcave lens, a third lens component of a biconvex lens and a fourth lens component of a meniscus negative lens with its convex surface on the image side, the said lens system satisfying the following conditions:

$$1.5 < f/f_{123} < 1.7 \quad (1)$$

$$-1.3 < f/f_4 < -1.0 \quad (2)$$

$$0.07 < d_5/f < 0.11 \quad (3)$$

$$0.14 < d_6/f < 0.19 \quad (4)$$

wherein the reference symbol f represents the focal length of the total lens system, the symbol $f_{123}$ represents the composite focal length of the first, second and third lens components, the symbol $f_4$ represents the focal length of the fourth lens component, the symbol $d_5$ represents the axial thickness of the third lens component and the symbol $d_6$ represents the axial air space between the third and fourth lens components, respectively.

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**4,303,314**

## COMPACT TELEPHOTO LENS

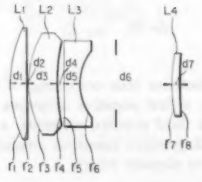
**Sei Matsui, Chiba, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan**

**Filed Mar. 3, 1980, Ser. No. 126,350**

**Claims priority, application Japan, Mar. 20, 1979, 54-31788**

**Int. Cl.³ G02B *9/34***

**U.S. Cl. 350—456** **4 Claims**



1. A compact telephoto lens having an angle of view of 18° to 24°, an aperture ratio of 1:2.8 and a telephoto ratio of 0.92 to 0.94, and consisting essentially of, in succession from the object side, a first lens which is a single positive lens having its surface of sharper curvature facing the object side, a second lens which is a positive meniscus lens having its convex surface facing the object side, a third lens which is a single negative lens having its surface of sharper curvature facing the image

side, a stop, and a fourth lens which is a single positive lens having its surface of sharper curvature facing the object side, said telephoto lens satisfying the following conditions:

$$\text{(I)}\quad \begin{cases} 0.35 < f_{12} < 0.4f \\ 0.2f < d_1 + d_2 + d_3 + d_4 + d_5 < 0.25f \\ 0.19f < r_6 < 0.21f \end{cases}$$

$$\text{(II)}\quad \begin{cases} 1.35f < f_{123} < 1.46f \\ 0.27f < d_6 < 0.32f \end{cases}$$

$$\text{(III)}\quad \begin{cases} n_1, n_2 > 1.6, n_3, n_4 > 1.7 \\ \gamma_1, \gamma_2 > 50, \gamma_3, \gamma_4 < 30 \end{cases}$$

where $r_1$–$r_8$ represent the radii of curvature, $d_1$–$d_7$ represent the center thickness and air spaces of the respective lenses, $n_1$–$n_4$ represent the refractive indices of the respective lenses, $\gamma_1$–$\gamma_4$ represent the Abbe numbers of the respective lenses, $f_{1-4}$ represent of the focal lengths of the respective lenses, f represents the total focal length of the entire system, $f_{123}$ represents the total focal length of the first to third lenses and $f_{12}$ represents the total focal length of the first and second lenses.

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**4,303,315**

## COMPACT WIDE ANGLE LENS

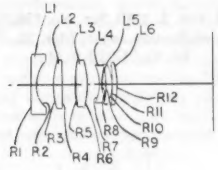
**Melvyn H. Kreitzer, Cincinnati, Ohio, assignor to Vivitar Corporation, Santa Monica, Calif.**

**Continuation-in-part of Ser. No. 83,289, Oct. 10, 1979, abandoned, which is a continuation of Ser. No. 941,522, Sep. 11, 1978, Pat. No. 4,182,549. This application Nov. 26, 1979, Ser. No. 97,552**

**The portion of the term of this patent subsequent to Jan. 8, 1997, has been disclaimed.**

**Int. Cl.³ G02B *9/62***

**U.S. Cl. 350—461** **5 Claims**




1. A retrofocus lens consisting of six elements from the object end, a first negative meniscus convex to the object, second and third positive elements, a fourth biconcave element, a fifth positive meniscus concave to the object and a sixth positive element where

$$0.8\ f_o > |f_1| > 0.6\ f_o \text{ and}$$

$$0.55\ f_o > f_2 > 0.5\ f_o$$

where

$f_1$ is the equivalent focal length (EFL) of the first element,

$f_2$ is the equivalent focal length (EFL) of the second and third elements,

$f_o$ is the EFL of the lens.

**4,303,316**

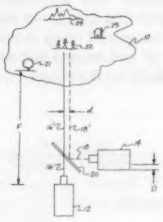
## PROCESS FOR RECORDING VISUAL SCENES FOR REPRODUCTION IN STEREOPSIS

**Robert H. McElveen, 103 Forest Hills Dr., Gaffney, S.C. 29340**

**Continuation-in-part of Ser. No. 952,780, Oct. 19, 1978, abandoned, which is a continuation-in-part of Ser. No. 751,141, Dec. 16, 1976, abandoned. This application Aug. 27, 1979, Ser. No. 69,708**

**Int. Cl.³ G03B *35/00***

**U.S. Cl. 352—57** **39 Claims**



1. A process for reproducing a visual scene which may be viewed in stereopsis by the unaided human eye comprising the steps of:

(a) recording a plurality of right and left views of a common visual scene from corresponding right and left positions laterally displaced from each other in a common plane at a distance of no more than about 1 inch apart, and

(b) continuously projecting, in alternation, a sequential group of one or more of said right recorded views and a sequential group of one or more of said left recorded views on to a receiving surface for viewing by the human eye, said duration of projection of said alternating groups being such that the visual duration of each group on said surface varies from a minimum to a maximum duration which is generally correspondingly proportional to the distance of the nearest non-moving object of special regard in the scene from said left and right recorded positions, and wherein said duration is approximately equal to the visio-psychological alternation rate between right and left views of the human visual apparatus.

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**4,303,317**

## CIRCUIT LAYOUT TO MEASURE EXPOSURE TIMES AND/OR TO CONTROL THE TIME OF EXPOSURE FOR A PHOTOGRAPHIC CAMERA

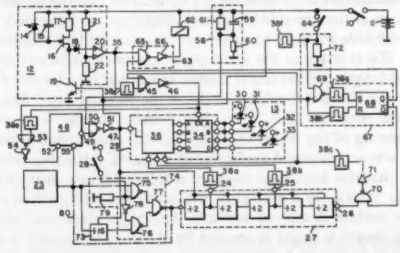
**Alfred Tempelhof, Brunswick, Fed. Rep. of Germany, assignor to Rollei-Werke, Brunswick, Fed. Rep. of Germany**

**Filed Jul. 5, 1979, Ser. No. 55,048**

**Claims priority, application Fed. Rep. of Germany, Jul. 6, 1978, 2829656**

**Int. Cl.³ G03B *7/093, 17/18;* G01J *1/46***

**U.S. Cl. 354—23 D** **26 Claims**



1. Apparatus for the measurement of exposure time and/or

for controlling the time of exposure of a photographic camera having a measuring unit responsive to the brightness of an object for generating an exposure time signal at a time when said object brightness corresponds to the proper exposure time of the camera, said apparatus comprising:

(a) an oscillator providing a constant frequency output,

(b) a frequency transforming device such as a frequency divider or frequency multiplier connected to said oscillator and having a plurality of output terminals, said frequency transforming device generating at said output terminals different frequency output signals offset in frequency with respect to one another and with respect to said oscillator frequency,

(c) a timing circuit having inputs connected to receive said different frequencies output signals of said frequency transforming device, said timing circuit providing a plurality of time duration signals, said time duration signals corresponding to and defining non-overlapping, contiguous time intervals,

(d) an intermediate storage device having signal input terminals connected to receive said time duration signals, a clock input terminal and signal output terminals, said intermediate storage device latching the current time duration signal on its input terminals to its output terminals in response to at least said exposure time signal fed to said clock input terminal,

(e) display means connected to said output terminals of said intermediate storage device for indicating which of said time intervals is latched by said intermediate storage device, and

(f) synchronization logic circuit means connected to said oscillator for synchronizing the operation of said timing circuit and said measuring unit,

whereby said time duration signals indicate which of a plurality of time intervals is appropriate for current exposure.

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**4,303,318**

## CAMERA EXPOSURE TIME CONTROL DEVICE

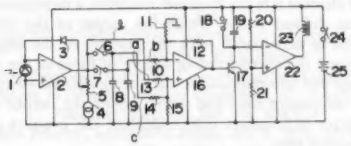
**Mashio Kitaura, Tondabayashi, and Koji Yamamoto, Sakai, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 24, 1980, Ser. No. 219,955**

**Claims priority, application Japan, Dec. 31, 1979, 54/171490**

**Int. Cl.³ G03B 7/083, 7/099**

**U.S. Cl. 354—24** **6 Claims**



**1.** In a camera which includes a focal plane shutter having leading and trailing shutter curtains for controlling the light reaching a film located at the focal plane of said camera, an exposure time control device comprising:

a light measuring circuit including light receiving means located to receive the light reflected from a surface of said leading shutter curtain before start of the travel of said leading shutter curtain, the light reflected from the surface of said leading shutter curtain and a surface of said film during the travel of said leading shutter curtain and the light reflected from the surface of said film after completion of the travel of said leading shutter curtain, said light measuring circuit generating a light measurement signal which is proportional to the logarithm of the intensity of said light received by said light receiving means;

first and second storing means for storing the light measurement signal from said light measuring circuit;

a first switch means arranged between said light measuring circuit and said first storing means for disconnecting said first storing means from said light measuring circuit in conjunction with the start of the travel of said leading shutter curtain;

a second switch means arranged between said light measuring circuit and said second storing means for disconnecting said second storing means from said light measuring circuit in conjunction with the completion of the travel of said leading shutter curtain;

an operational circuit having a first input terminal connected to said first storing means, a second input terminal connected to said second storing means and a third input terminal connected to said light measuring circuit, and generating a corrected signal by combining the light measurement signal to said third input terminal with the light measurement signal to said second input terminal subtracted by the light measurement signal to said first input terminal;

means for generating a shutter closing signal for actuating said shutter closing means when a period of time dependent on the corrected signal has lapsed from the start of the travel of said leading shutter curtain; and electromagnetic means for starting the travel of said trailing shutter member in response to said shutter closing signal.

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**4,303,319**

## UNIDIRECTIONAL FOCUSSING SYSTEM

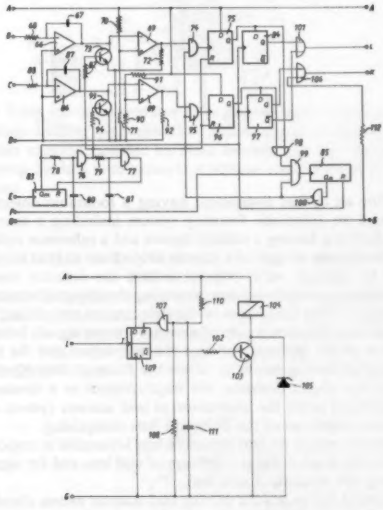
**August Hell, Feldkirchen, and Istvan Cocron, Munich, both of Fed. Rep. of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Jun. 26, 1979, Ser. No. 52,962**

**Claims priority, application Fed. Rep. of Germany, Jun. 30, 1978, 2828865**

**Int. Cl.³ G03B 3/10**

**U.S. Cl. 354—25** **12 Claims**



**1.** In a photographic-camera focussing system having an objective adjustable in a first direction from a first extreme subject-distance setting to a second extreme subject-distance setting, in combination: first and second photodetector means located to receive light from a subject to be photographed; comparing means for comparing the light incident on the first and second photodetector means and generating in dependence upon the present subject-distance setting of the objective a first signal when the camera-objective subject-distance setting should be changed in the first direction, a second signal

when the camera-objective subject-distance setting should be changed in an opposite second direction, and generating both the first and second signals concurrently when the camera-objective subject-distance setting is within a predetermined tolerance range of acceptable error; means constraining the camera objective to be at the first extreme subject-distance setting at the start of a focussing operation, whereby in order to bring the camera objective to the correct subject-distance setting it is necessary that the camera-objective subject-distance setting be changed in the first direction from the first extreme setting towards the second extreme setting thereof; and stop-signal-generating means operative in response to said second signal for generating a stop signal commanding that adjustment of the camera-objective subject-distance setting be stopped, whereby as the subject-distance setting is changed in said first direction from said first extreme setting towards said second extreme setting the stop signal is generated in response to generation of said second signal as the subject-distance setting error just enters into the range of acceptable error.

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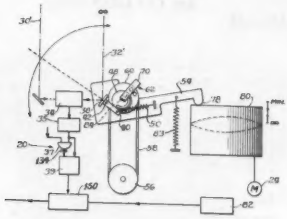
**4,303,320**

## AUTOMATIC FOCUS ADJUSTING DEVICE

**Tadao Isono, Kokubunji, Japan, assignor to Osawa Precision Industries, Ltd., Japan**

**Continuation-in-part of Ser. No. 860,031, Dec. 12, 1977, abandoned. This application Jul. 12, 1979, Ser. No. 57,069**
**Claims priority, application Japan, Dec. 10, 1976, 51-147757**
**The portion of the term of this patent subsequent to Oct. 31, 1995, has been disclaimed.**
**Int. Cl.³ G03B *13/18, 3/10;* G01J *1/44***
**U.S. Cl. 354—25** **1 Claim**



1. For an optical instrument having a focusable objective lens, and an automatic focusing system including a scanner optical system having a scanner means and a reference optical system wherein images of a remote subject are caused respectively to impinge on a detector means, the detector means generating an output signal representing the object distance of the subject when the images on the detector are coincident, the elapsed time between a pair of detector output signals being a function of the distance between the instrument and the subject, and including means to adjust the focus of the objective lens to the object distance, the improvement in a means to compare and relate the orientation of said scanner system and the focus condition of the objective lens comprising:

reference means on said objective lens adjustable in response to variations in focus condition of said lens and for signalling the position of said lens,

scanner drive means for driving said scanner means about an axis oscillatably through a predetermined angle,

means supporting the scanner means for arcuate movement of the axis thereof,

means on said scanner supporting means for engagement with said objective lens focus condition reference means for arcuate positioning of said supporting means,

electronic circuit means connected to said detector means and said reference means to convert the timing of said output signals therefrom to a voltage of amounts relative to the position of the subject and the position bisector of said scanner oscillation,

said electronic circuit including an AND circuit for comparing the timing of said detector signals with a signal from said scanner equal to the time of one oscillation to emit a control signal equal to the difference therebetween, and

control means connected to receive the sum of said timing signal and said lens position signal for automatically focusing said lens.

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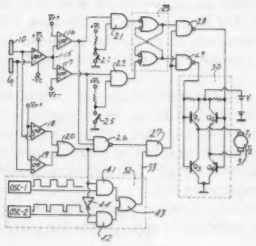
**4,303,321**

## PHOTOGRAPHIC CAMERA OF AUTOMATIC FOCUSSING TYPE

**Shigeo Enomoto, Tokyo, and Mitsuhiko Shimoda, Asaka, both of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 19, 1980, Ser. No. 218,440**
**Claims priority, application Japan, Dec. 12, 1979, 54-173925**
**Int. Cl.³ G03B *3/10***
**U.S. Cl. 354—25** **12 Claims**



1. A photographic camera of automatic focussing type capable of focussing objects between a minimum and infinite distance comprising:

a movable objective lens;

a photoelectric focussing detector having a photoconductive element responsive to light rays passing through the objective lens from an object to be photographed, said photoconductive element providing a maximum response when an image of the object formed on the photoconductive element is in the focussed condition, a responsive zone being defined within which the output of the detector varies in accordance with the position of the objective lens and the corresponding degree of focus of the object image and non-responsive zones being defined away from the responsive zone and within which the output of the detector is invariant independent of the position of the objective lens;

a focussing motor coupled to the objective lens for moving the lens for focussing the image of an object to be photographed;

a first electrical circuit for determining the direction of movement of the focussing motor for moving the objective lens to focus the object image;

a second electrical circuit for generating a focussing motor drive signal for causing the motor to rotate at a first speed when the objective lens is in the non-responsive zone, said second electrical circuit for generating a focussing motor drive signal for causing the motor to rotate at a second speed that is less than said first speed when the objective lens is in the responsive zone;

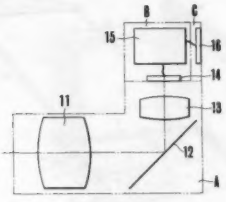
a first switch adapted to be actuated when the objective lens is at a position for focussing at the infinite distance; and

a second switch adapted to be actuated when the objective lens is at a position for focussing at the minimum distance, said first and second switches coupled to the first electrical circuit such that when either switch is actuated the rotation of the focussing motor is reversed.

## 4,303,322
## ELECTRONIC IMAGE PICK-UP DEVICE FOR A SINGLE-LENS REFLEX CAMERA HAVING AN INTERCHANGEABLE FINDER

**Hiromi Someya, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 1, 1980, Ser. No. 211,734**
**Claims priority, application Japan, Nov. 29, 1979, 54-165326[U]**
**Int. Cl.³ G03B** *7/099, 13/02*
**U.S. Cl. 354—31** **9 Claims**




1. An electronic image pick-up device for attachment to a single lens reflex camera of the type which can accept a replaceable optical finder at a finder unit receptacle on the camera body, comprising:

(a) a casing shaped to fit the finder unit receptacle on the camera body;

(b) a solid state image pick-up element having an image receiving surface arranged within said casing so that an object image provided in the camera is applied on said image receiving surface when said casing is attached to the camera, and said solid state image pick-up element operates to produce picture signal elements in response to said object image;

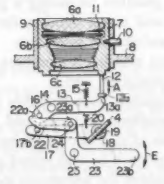
(c) a readout control circuit coupled to said solid state image pick-up element for reading out a picture signal of prescribed form including said picture signal elements from said solid state image pick-up element; and

(d) a picture signal output terminal on said casing, said picture signal output terminal being coupled to said readout control circuit to provide said picture signal.

## 4,303,323
## FOCUS CORRECTING DEVICE FOR USE IN A RANGEFINDER CAMERA

**Toshihiro Imai, and Toyotaka Yamada, both of Hachioji, Japan, assignors to Olympus Optical Company Ltd., Tokyo, Japan**

**Filed Jun. 12, 1980, Ser. No. 158,924**
**Claims priority, application Japan, Jul. 6, 1979, 54/85723**
**Int. Cl.³ G03B** *13/20*
**U.S. Cl. 354—166** **5 Claims**




1. A focus correcting device for use in a rangefinder camera; the device comprising:

imaging optics means including an apertured diaphragm and a focus adjusting mechanism;

a rangefinder interlocked with finder optics means and including an optical system for determining a distance to an object being photographed;

an interlocking mechanism providing an operational coupling between said rangefinder and said focus adjusting mechanism;

correction means operationally connected to said focus adjusting mechanism to correct for a displacement of the focal point which occurs in response to a change in the diaphragm aperature of said apertured diaphragm;

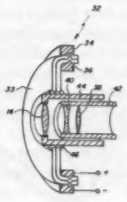
said rangefinder including a rotatable mirror, and said correction means including a correction member disposed in said interlocking mechanism which transmits a travel of the lens of said imaging optics means required for focussing to said rotatable mirror; and

said correction member being adapted to move into or out of a transmission path which transmits the travel of the lens to the rotatable mirror to thereby define a start position for the angular movement of the rotatable mirror as the diaphragm aperture is changed.

## 4,303,324
## ANNULAR PIEZOELECTRIC PLASTIC BENDER LENS MOTOR

**Michael A. Marcus, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 6, 1980, Ser. No. 194,323**
**Int. Cl.³ G03B** *7/08, 13/02;* **G02B** *7/02*
**U.S. Cl. 354—195** **4 Claims**

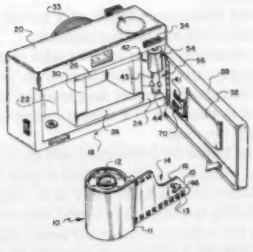



4. Lens moving apparatus for a photographic camera, comprising: annular piezoelectric bender means of piezoelectric plastic material coupled between the lens and the camera for moving the lens in response to a voltage applied to said bender means.

## 4,303,325
## ROLL FILM AND A PHOTOGRAPHIC CAMERA FOR USE THEREWITH

**Neil G. Seely, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 10, 1980, Ser. No. 195,992**
**Int. Cl.³ B65H** *75/28;* **G03B** *17/26, 1/24*
**U.S. Cl. 354—212** **10 Claims**




4. In a roll film having a leader provided with an aperture adapted to be engaged by a capturing member of a rotatable

film take-up spool, the improvement comprising a flexible tongue element extending forwardly into the aperture, said tongue element being adapted to flex out of the surrounding film plane upon initial engagement with said capturing member and subsequently to snap back to a substantially unflexed condition as the capturing member fully enters the aperture and the tongue element detentably cooperates with the capturing member.

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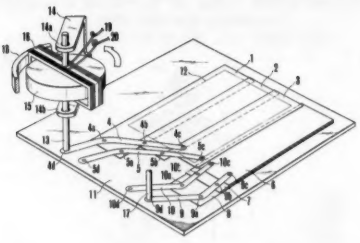
4,303,326

## ELECTROMAGNETICALLY DRIVEN SHUTTER DEVICE FOR CAMERA

Masayoshi Kiuchi, Yokohama, and Syuichiro Saito, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 20, 1980, Ser. No. 161,390
Claims priority, application Japan, Jun. 20, 1979, 54/77800
Int. Cl.[3] G03B 7/08, 9/08, 9/40
U.S. Cl. 354—234 8 Claims



1. An electromagnetically driven shutter for a camera, comprising:

(a) a permanent magnet member composed of a ferromagnetic substance having a large coercive force;

(b) a conductive member arranged to be under the influence of the magnetic field formed with the permanent magnet member, one of the conductive member and the permanent magnetic member being secured on the camera body and the other being movable;

(c) a shutter blade arrangement including a plurality of light shading thin plates for blocking the photographing light path of a camera, and including a part connected to the plates and operatively connected to the movable one of the permanent magnetic member and the conductive member;

(d) source means coupleable to a power source to supply current to the conductive member;

(e) first switching means in series with said source means for forming a current supply circuit from the power source to the conductive member and to close the current supply circuit in response to a shutter release signal;

(f) a capacitor; and

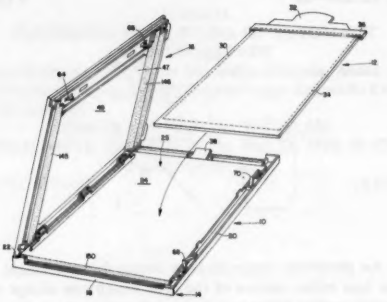
(g) circuit means for connecting said capacitor to said source means along a path outside said conductive member so as to charge said capacitor prior to a release signal, and for connecting said capacitor to add the voltage of the capacitor to the voltage at the source means and apply it through the conductive member in response to a release signal so as to increase the initial speed of the shutter blade arrangement.

4,303,327

## FILM CASSETTE WITH PRESSURE PLATE ASSEMBLY LATCHING SYSTEM

Theodore J. LaBelle, Dorchester, and Duncan C. Sorli, Chelmsford, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 3, 1980, Ser. No. 203,124
Int. Cl.[3] G03B 17/26, 41/18
U.S. Cl. 354—276 9 Claims



1. A cassette for releasably holding a film unit and for locating it at an exposure position therein, said cassette comprising:

a base section having a bottom wall portion including a first interior film bearing surface;

a cover section, including a top wall portion having an aperture therein, being locatable in a closed position over said base section wherein said top wall portion is spaced a fixed distance from said first bearing surface and said aperture is in registration therewith, and wherein said base and cover sections cooperate to define a light sealed film withdrawal opening at one end of said cassette;

a pressure plate assembly, including an exterior surface and a second interior film bearing surface, mounted on said cover section within and in covering relation to said aperture with said second bearing surface facing said first bearing surface for movement toward and away from said base section between a raised film release position wherein said facing bearing surfaces exert minimal pressure on the film unit therebetween to facilitate its withdrawal and a lowered pressure applying position wherein said second bearing surface is closer to said first bearing surface, than in said raised position, and they cooperate to apply a greater pressure to the film unit to locate it at said exposure position;

means for biasing said pressure plate assembly toward said raised position;

means for releasably latching said pressure plate assembly in said lowered position including a pair of latch members mounted on said cover section for movement between latching and unlatching positions;

means for biasing said latch members toward their respective latching positions; and

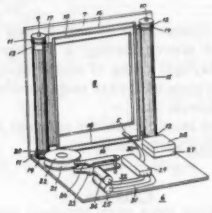
means on said pressure plate assembly for releasably holding said latch members in their said unlatching positions against the bias of said latch member biasing means when said pressure plate is in said raised position, for releasing said latch members for automatic movement to their said latching positions in response to movement of said pressure plate assembly to said lowered position, and thereafter responsive to movement of said latch members back to their said unlatching positions and the automatic movement of said pressure plate assembly back to said raised position caused thereby for again releasably holding said latching members in their said unlatching positions.

4,303,328

## DEVICE FOR PHOTOGRAPHIC CAMERAS WITH FOCAL PLANE SHUTTER

Kjell-Anders Persson, Skene, and Lennart Stalfors, Hindas, both of Sweden, assignors to Victor Hasselblad Aktiebolag, Gothenburg, Sweden

Filed Feb. 4, 1980, Ser. No. 118,306
Claims priority, application Sweden, Jul. 2, 1979, 7905760
Int. Cl.[3] G03B *17/02, 17/26*
U.S. Cl. 354—288 10 Claims



1. A device for photographic cameras with focal plane shutter, characterized in that on the camera surface facing toward the film magazine, alternatively toward the camera back, a member for sensing the film magazine, alternatively the camera back, is provided which directly or indirectly is coupled to the focal plane shutter for releasing the opening part thereof when the film magazine is being removed, alternatively when the camera back is being opened or removed.

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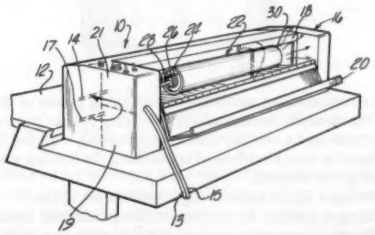
4,303,329

## DIAZO COPY MACHINE WITH AMMONIA VAPOR ABSORBER

Norman Michlin, Southfield, Mich., assignor to Universal Developer Corporation, Detroit, Mich.

Filed May 10, 1979, Ser. No. 38,031
Int. Cl.[3] G03D *7/00*
U.S. Cl. 354—300 3 Claims



1. In a diazo copying machine having a developer chamber utilizing ammonia vapors to develop images on diazo copying material and a vacuum chamber including an evacuation tube for removing ammonia vapors generated during the development process, the improvement comprising:

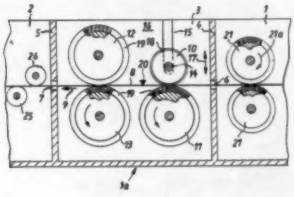
an elongated ammonia absorbing canister supported on said diazo copying machine with said evacuation tube being connected to said canister to pass vapor evacuated from said vacuum chamber through said canister, said canister containing a composite mixture of activated charcoal granules and fibrous excelsior treated with phosphoric acid, whereby said canister may be positioned in various orientations on said copying machine without degradation of the ammonia absorbing efficiency of said canister.

4,303,330

## DEVICE FOR PROCESSING A PHOTOGRAPHIC FILM

Wilfried Hehn, Munich; Siegfried Kurths, Taufkirchen; Werner Sieber, and Franz Kocourek, both of Munich, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 26, 1980, Ser. No. 210,765
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1979, 2951847
Int. Cl.[3] G03D *5/00*
U.S. Cl. 354—319 10 Claims



1. A device for processing photographic film of relatively large width and having an emulsion carrying surface and a back surface, comprising a housing including a moistening chamber and a drying chamber; transporting means located in said moistening chamber and adapted to advance said film toward said drying chamber, said transporting means having a pair of transporting rollers rotated with a predetermined speed; and a pair of counterpositioned squeegee rollers positioned between said moistening chamber and said drying chamber and adapted to squeeze moisture from said film, said squeegee rollers including an upper idling squeegee roller contacting said emulsion carrying surface and a driven lower squeegee roller contacting said back surface of the film, said lower squeegee roller having a speed of rotation exceeding said predetermined speed to apply a predetermined tension to said back surface of said film.

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4,303,331

## MAGNET FOR USE IN A MAGNETIC BRUSH DEVELOPMENT SYSTEM

Robert L. Thompson, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 5, 1979, Ser. No. 91,421
Int. Cl.[3] G03G *15/00*
U.S. Cl. 355—3 DD 19 Claims

1. A magnetic member for attracting magnetic particles to a transport of a reproducing machine, including:

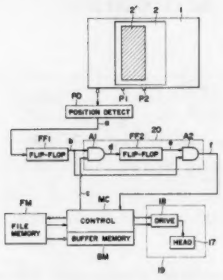
an arcuate magnetic portion having a plurality of magnetic poles impressed thereon by magnetizing said magnetic portion to saturation; and

at least one non-magnetic portion disposed interiorly of said magnetic portion so that the volume of magnetic material in the magnetic member varies producing a magnetic field having a pre-selected intensity profile.

## 4,303,332
## ELECTROSTATIC RECORDING APPARATUS

**Yuki Sakai, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Filed Dec. 7, 1979, Ser. No. 101,190**
**Claims priority, application Japan, Dec. 13, 1978, 53-153170**
**Int. Cl.³ G03G** *15/09, 15/30*
**U.S. Cl. 355—14 R** **3 Claims**

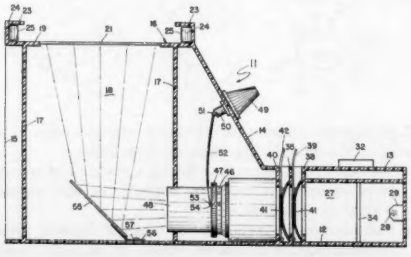



1. In an electrostatic recording apparatus which is capable of composite reproduction, having an original projecting device for forming an electrostatic latent imge of an original picture on the surface of a photosensitive member by scanning and projecting an original on a copy board, and a picture-forming device for causing a memory to read electric signals of characters fed from an external source and then forming an electrostatic latent image of characters on the surface of the photosensitive member based upon the thus read signals, the improvement characterized by comprising a position signal generator for producing position signals which give positions of the original picture on the copy board in relation to the scanning for projection, and a control signal generator for producing control signals responsive to the position signals and printing section signals which give sections in which the picture-forming device is allowed to effect the printing, wherein a main control unit of the picture-forming device feeds the printing section signals to the control signal generator and controls the input and output of the memory as well as printing of characters upon receipt of control signals from the control signal generator, such that an original picture can be inserted between lines that are specified by the position signals of pictures in the form of electric signals.

## 4,303,333
## PHOTOGRAPHIC PRINTING DEVICE

**William R. Mechnick, Chemin Des Prelets, 1027 Lonay, Switzerland**

**Filed Sep. 19, 1979, Ser. No. 76,820**
**Int. Cl.³ G03B** *27/32, 27/52*
**U.S. Cl. 355—27** **21 Claims**



1. A device for producing photographic prints from a transparency on a printing medium having a daylight film rating comprising:

(a) a housing having an image forming chamber and a substantially light-tight compartment located adjacent said chamber, said compartment having an aperture extending through said housing for allowing an image to be printed on said printing medium;

(b) a lens extending from said image-forming chamber to said light-tight compartment;

(c) a reflecting mirror positioned in said light-tight compartment for reflecting an image from said lens to said aperture;

(d) a source of illumination located in said image-forming chamber, said source having a Kelvin rating which matches the daylight rating of said printing medium;

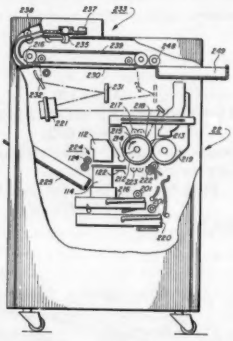
(e) an opalescent plate located in said chamber adjacent said illuminating source; and

(f) means located in said chamber adjacent said opalescent plate for holding a transparency.

## 4,303,334
## HEAT REGULATOR FOR THE FUSING DEVICE IN AN ELECTROSTATIC COPIER

**George J. Haupt; Gerald E. Carlson, both of Webster, and Eugene S. Evanitsky, Pittsford, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Oct. 1, 1979, Ser. No. 80,958**
**Int. Cl.³ G03B** *27/00;* **G03G** *15/00*
**U.S. Cl. 355—133** **9 Claims**



1. In a reproduction machine for producing copies of documents, the machine having a fuser for fixing images produced on the copies and a cooling system cooperating with the fuser for dissipating heat, a method of controlling the cooling system comprising the steps of,

generating a signal manifesting a production cycle,

activating a counter in response to the production cycle,

monitoring the counter during machine cycle out, and

controlling the cooling system depending upon the count contents of the counter.

## 4,303,335
## AUTOMATIC DISTANCE MEASURING DEVICE

**Motonobu Matsuda, Kawachinagano, and Yoshihiro Tanaka, Osaka, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Aug. 10, 1979, Ser. No. 65,747**
**Claims priority, application Japan, Aug. 21, 1978, 53-102180**
**Int. Cl.³ G01C** *3/00, 5/00*
**U.S. Cl. 356—1** **10 Claims**

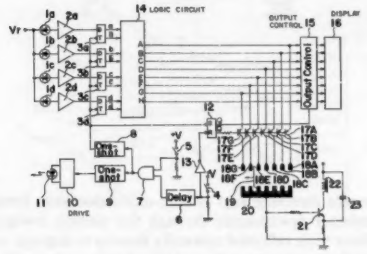
1. A distance measuring device which comprises:

means for directing a beam of light towards a target object;

means for receiving the beam of light reflected by the target

object, said receiving means having a plurality of at least three light sensing portions, the optical axes of which intersect the path of travel of said beam of light in different ranges of distance from said directing means;

means responsive to said receiving means for signaling whether conditions of the respective light sensing portions are light sensing or non-light sensing; and




logic circuit means for logically processing the outputs from said signaling means for each of all relationships of any of said sensing portion's condition with that of all other sensing portions' conditions and generating an output indicating a preselected target object distance range for each of such relationships.

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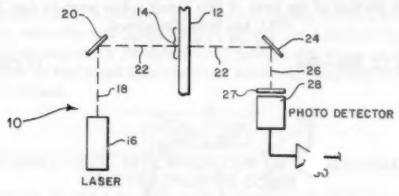
4,303,336

## METHOD AND APPARATUS FOR MAKING A RAPID MEASUREMENT OF THE HEMATOCRIT OF BLOOD

Herbert M. Cullis, Silver Spring, Md., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Aug. 28, 1978, Ser. No. 937,089
Int. Cl.[3] G01N *33/48, 21/00, 21/84*
U.S. Cl. 356—39 22 Claims



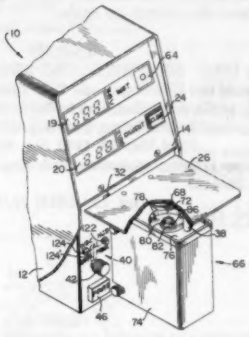

1. Method for making a non-invasive, non-destructive, rapid, relatively accurate measurement in vivo of the hematocrit of undiluted blood including the steps of: passing the undiluted blood through a liquid confining means having a light transmitting portion; passing intense, coherent, monochromatic light through the light transmitting portion and undiluted blood; sensing the transmittance of light passed through the light transmitting portion and undiluted blood; producing an output signal related to the amount of transmitted light sensed and indicative of the light absorbed by the red blood cells; and multiplying the output signal by a proportionality factor determined from a curve function obtained from an approximated curve fit of absorbance v. hematocrit measurements for measurements of light absorbance by blood having known hematocrits to produce a corrected output signal which is indicative of the hematocrit of the undiluted blood and which can be used to control the flow rate of at least one pump pumping whole blood or a fluid component thereof in a blood processing apparatus.

4,303,337

## APPARATUS FOR DETERMINING HEMOGLOBIN AND WHITE BLOOD CELL COUNT IN BLOOD

Bobby D. James, Hialeah; Ronald O. Simpson, and J. David Starling, both of Miami, all of Fla., assignors to Coulter Electronics, Inc., Hialeah, Fla.

Filed Mar. 26, 1979, Ser. No. 23,958
Int. Cl.[3] G01N *21/01, 27/04*
U.S. Cl. 356—72 38 Claims



1. In an electronic particle analysis apparatus wherein there is provided a hydraulic and pneumatic system for moving fluids by hydraulic means and by pneumatic means from selected locations to predetermined destinations in accordance with a selected operating cycle and wherein a vacuum level is to be established for employment only to perform selected functions during said operational cycle, the improvement comprising vacuum generating means for establishing said vacuum and control means coupled thereto for operating said vacuum generating means to draw vacuum only when vacuum is required to move fluid through scanning aperture means for particle study during said operational cycle.

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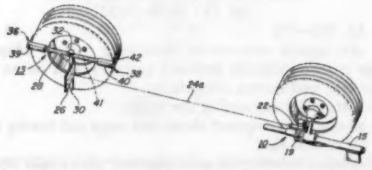
4,303,338

## WHEEL ALIGNMENT METHOD AND APPARATUS

Leonard A. Morrison, Chicago; Robert S. Hampton, Waukegan; Craig E. Mountz, Wadsworth; John W. Murphy, and Phillip A. Spainhour, both of Waukegan, all of Ill., assignors to Ammco Tools, Inc., North Chicago, Ill.

Filed Sep. 4, 1979, Ser. No. 71,950
Int. Cl.[3] G01B *11/275*
U.S. Cl. 356—155 4 Claims



1. A method of aligning the front or rear wheels of a vehicle having a pair of front wheels, a pair of rear wheels, and a steering wheel comprising the steps of:

while holding said steering wheel in a centered, straight ahead position, setting the angles of one of said pairs of wheels relative to one another to the desired toe angle settings,

mounting graduated screens to the outside of each of the other of said pair of wheels with said screens lying in planes which are substantially perpendicular to the planes of the wheels to which they are mounted, then

sighting along each of said one pair of wheels to the respective screens on the same side of the vehicle and determining the relative positions at which the lines of sight are intercepted by said screens, and then

adjusting the toe angles of each of said wheels by an angular amount proportional to one-half the difference between said relative positions,

whereby said steering wheel will be in a centered, straight ahead position when said vehicle is traveling in a straight ahead direction and said one of said pair of wheels will have the desired toe angle.

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**4,303,339**

## GRAPHITE TUBE ASSEMBLY

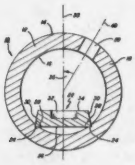
**Horst Gläser, Überlingen, and Rolf Tamm, Salem, both of Fed. Rep. of Germany, assignors to Bodenseewerk Perkin-Elmer & Co., GmbH, Überlingen, Fed. Rep. of Germany**

**Filed May 29, 1980, Ser. No. 154,727**

**Claims priority, application Fed. Rep. of Germany, Jun. 15, 1979, 2924123**

**Int. Cl.³ G01N *21/74***

**U.S. Cl. 356—244** **6 Claims**



1. A graphite tube assembly for use in an atomic absorption spectrometer comprising:

a graphite tube adapted to permit a radiation beam to be transmitted therethrough, said tube having an inlet port extending through a wall thereof; and

a sample holding platform having a recess in one surface thereof for retaining a sample material to be tested, said sample holding platform being adapted to be disposed within said graphite tube external of said beam path, said platform and said tube having, cooperatively mating surfaces for locating said platform at a preselected orientation within said tube whereby said platform can be removed and reinserted, or exchanged with another similarly shaped platform, to said preselected orientation.

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**4,303,340**

## OPTICAL MICROMETER MEASURING SYSTEM

**Robert Hoffman, 17 Copper Beech Pl., Merrick, N.Y. 11566**

**Filed Jun. 26, 1979, Ser. No. 52,320**

**Int. Cl.³ G02B *27/32***

**U.S. Cl. 356—372** **14 Claims**

1. An optical micrometer measuring system adapted to gauge minute distances between spaced points on an object under test, said system comprising:

A. a stage for supporting the object;

B. an objective disposed above said stage and having a vertical optical axis;

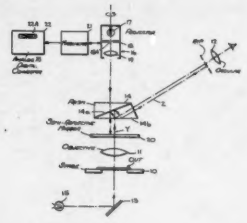
C. a beam-splitting element disposed above said objective and having an interface inclined relative to said vertical axis;

D. a semi-reflective mirror interposed between said objective and said element;

E. means including an object light source to illuminate said object to produce object-modulated rays which are directed by said objective upwardly through said mirror onto said element interface, the rays being deflected by said interface toward a main optical path to create in the real image plane of said objective an aerial object image;

F. an eyepiece disposed in said main path to provide an operator with a magnified view of the object image;

G. a pointer image projector including a projector light source whose rays are masked by a mask component having a shaped aperture which defines the geometry of the pointer and are projected by a projection lens component to produce pointer-modulated rays;



H. means directing said pointer-modulated rays from the projector downwardly through the element toward the mirror to be reflected upwardly thereby to impinge on the interface and to be deflected thereby along the main optical path toward the real image plane to produce a pointer image thereon which is superimposed over the object image; and

I. micrometer means operatively coupled to said projector to laterally displace the pointer image to transverse the distance between any two spaced points on the object image and to indicate said distance.

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**4,303,341**

## OPTICALLY TESTING THE LATERAL DIMENSIONS OF A PATTERN

**Hans P. Kleinknecht, Bergdietikon, Switzerland, and Wolfram A. Bösenberg, Middlesex, N.J., assignors to RCA Corporation, New York, N.Y.**

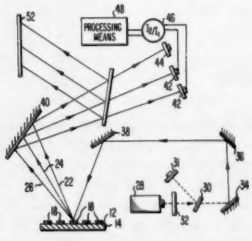
**Division of Ser. No. 862,190, Dec. 19, 1977, Pat. No. 4,200,396.**

**This application Dec. 7, 1979, Ser. No. 101,166**

**The portion of the term of this patent subsequent to Apr. 29, 1997, has been disclaimed.**

**Int. Cl.³ G01N *21/32***

**U.S. Cl. 356—384** **17 Claims**




1. Apparatus for optically testing the lateral dimensions of a diffraction grating pattern of material disposed on a substrate, said diffraction pattern comprised of a planar array of spaced strips of material having a strip width w and periodicity d, comprising:

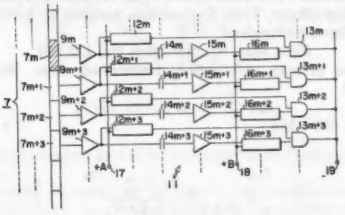
means for exposing said diffraction pattern to a beam of monochromatic light to diffract said beam into diffracted beams of various orders;

detector means including detectors for measuring the intensity of two of the diffracted beams to obtain two intensity signals ($I_1$ and $I_2$) and means responsive to said intensity signals for determining the width w of said strips.

## 4,303,342
## METHOD AND APPARATUS FOR DETECTING FOREIGN MATTERS IN LIQUIDS

Toshio Takahashi, Honjo, Japan, assignor to Eisai Co., Ltd., Tokyo, Japan

Filed Mar. 3, 1980, Ser. No. 126,615
Claims priority, application Japan, Mar. 8, 1979, 54-27126
Int. Cl.³ G01N 21/90
U.S. Cl. 356—427 8 Claims

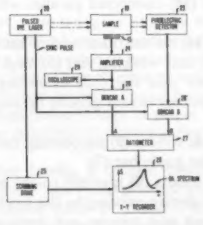


1. In an apparatus for detecting foreign matters in liquids by turning at a high speed a transparent container filled with a liquid, bringing the container to a standstill quickly, permitting suspended foreign matters to swirl with the liquid, illuminating the liquid and foreign matters, causing the transmitted light to be received by light receivers of a light detector provided in correspondence with the container, and measuring the change of incident light and transmitted light, the improvement which comprises the light receiver including an aggregate of small light receivers, each of said light receivers being connected to a corresponding unit of a first comparator group which compares the DC signal component obtained from the small light receivers with the standard value arbitrarily set as the signal level for detection of the liquid level to be excluded, each of said small light receivers being connected to a corresponding unit of a second comparator group which compares the AC signal component obtained from the small light receivers with the standard value set as the level for detection of foreign matters, said first comparator group and said second comparator group being connected to a corresponding AND circuit group, whereby said small light receivers are inhibited from issuing an output for judgement of rejection due to an output from one of said small light receivers which corresponds to the liquid surface.

## 4,303,343
## OPTOACOUSTIC SPECTROSCOPY OF CONDENSED MATTER IN BULK FORM

Chandra K. N. Patel, Summit, N.J., and Andrew C. Tam, Sunnyvale, Calif., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 29, 1980, Ser. No. 125,985
Int. Cl.³ G01N 21/01
U.S. Cl. 356—432 8 Claims



1. An improved method for optoacoustic spectroscopy of a bulk sample of relatively transparent condensed matter comprising

(a) irradiating at least a part of the sample, the source region, with a pulsed beam of radiation of frequency $\nu$ and pulse length $\tau_p$, with pulse rate $\nu_R$,

(b) limiting the beam dimensions to a maximum cross-sectional dimension of the source region $L_m$, and

(c) detecting elastic waves generated in the sample that have propagated to the detecting means substantially only through condensed matter,

wherein the improvement comprises

(d) adjusting $\tau_p$ to be between about $10^{-7}$ and $10^{-4}$ seconds.

(e) adjusting $\nu_R$ to be much less than about $\tau_p^{-1}$, and

(f) adjusting the beam such that $L_m \lesssim v\tau_p$, and simultaneously $L_m$ to be much greater than about $(4\tau_p D)^{\frac{1}{2}}$, where

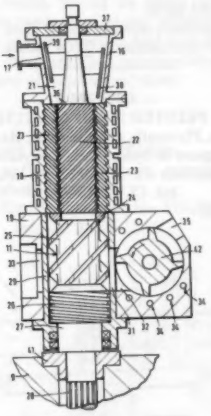
v is the phase velocity in the sample of elastic compressional waves, and

D is the thermal diffusivity of the sample material.

## 4,303,344
## EXTRUDERS FOR THERMOPLASTICS MATERIAL

Werner Müller, Hanover, Fed. Rep. of Germany, assignor to Hermann Berstorff Maschinenbau GmbH, An der Breiten Wiese, Fed. Rep. of Germany

Filed Jun. 10, 1980, Ser. No. 158,280
Claims priority, application Fed. Rep. of Germany, Jun. 15, 1979, 2924318
Int. Cl.³ B29B 1/10
U.S. Cl. 366—76 10 Claims

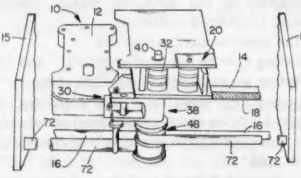


1. A two stage screw extruder for thermoplastic moulding materials, said extruder comprising a first, vertical extruding stage and a second, horizontal extruding stage; a working chamber for each of said stages; a passage connecting said working chambers; said working chambers being off-set from one another so that each lies at a tangent to the other at a lower outlet region of said vertical stage and a drawing in region of said horizontal stage; a planetary plasticising portion for said vertical stage; a screw shaft for said vertical stage; a lower axial pressure bearing supporting said screw shaft; and a butting ring for planet spindles of said planetary plasticising portion disposed on said screw shaft at the lower end of said planetary plasticising portion.

## 4,303,345
## INK RIBBON DRIVE FOR DATA PRINTERS

Christopher O. Lada, Ann Arbor, Mich., assignor to Sycor, Inc., Ann Arbor, Mich.

Filed Jun. 20, 1979, Ser. No. 50,133
Int. Cl.³ B41J 33/14
U.S. Cl. 400—229 13 Claims



1. In a printer of the type having a frame, a carriage, means for translating the carriage back and forth, support means for mounting a ribbon cartridge to contain a ribbon, and ribbon drive means to engage the ribbon for driving the ribbon as the carriage translates back and forth, wherein the improvement comprises said ribbon drive means comprising:

a vertically oriented drive shaft supported on said carriage for rotary motion;

a first hub supported on the shaft by a one-way bearing;

a first constant-tension, coiled band spring coiled around said first hub and having one end secured to the frame;

a second hub supported on the shaft by another one-way bearing; and

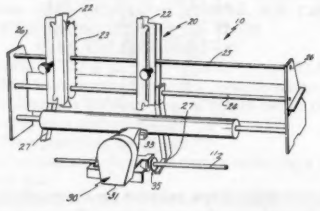
a second constant-tension, coiled band spring coiled around said second hub and having one end secured to the frame whereby the drive shaft is driven in one direction alternately by said first and second hubs as the carriage translates back and forth,

each of said constant-tension, coiled band springs having a thickness of approximately 0.004 inches.

## 4,303,346
## PRINTER HEAD CLUTCH

William J. Basse, Plymouth, and James M. Baker, Clinton, both of Mich., assignors to Sycor, Inc., Ann Arbor, Mich.

Filed May 14, 1979, Ser. No. 38,683
Int. Cl.³ B41J 29/50
U.S. Cl. 400—342 16 Claims

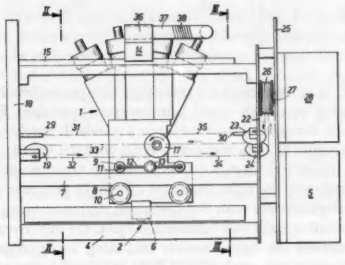


1. A clutch means for stopping lateral motion of a movable print head in a data printer, said printer having an elongated shaft element along which the print head is laterally movable during printing operation, comprising: a clutch member, and means for coupling said clutch member to the print head for lateral movement therewith; said clutch member being selectively positionable between an engaging position wherein said clutch member engages said elongated shaft and generates a stopping force for stopping said print head, and a travel position wherein said clutch member moves freely along said elongated shaft permitting free movement of said print head; and an actuating means for positioning said clutch member in its said engaging position, said actuating means being movable to selected positions along the length of said elongated shaft independently with respect to the print head so as to selectively define the extent of lateral print head motion.

## 4,303,347
## MATRIX PRINTER CARRIAGE ARRANGEMENT

Fritz Siegenthaler, Trub, Switzerland, assignor to Autelca AG, Gümligen, Switzerland

Filed Mar. 31, 1980, Ser. No. 135,550
Claims priority, application Switzerland, Mar. 30, 1979, 2968/79
Int. Cl.³ B41J 25/30, 19/30
U.S. Cl. 400—354 3 Claims



1. In a matrix printer having a matrix printing head (1) having a working end (6), a printing site (2) adjacent the working end (6), and guide means (7, 8, 9, 14, 15) connected to guide the matrix printing head (1) in parallel to the line direction close to the printing site (2); said guide means comprising:

rolling guide means (7, 8, 9) connected to guide the working end (6) of the matrix printing head (1) in parallel to the line direction, and sliding guide means (14,15) connected to guide the other end of the matrix printing head (1) in parallel to the line direction;

said rolling guide means including

a stationary guide bar (7), and first (8) and second (9) guide rollers;

said first guide rollers (8) rotatable on axles (10) fixedly mounted to said matrix printing head (1) near the working end (6) thereof, said first guide rollers (8) having profiled edges engaging the side of said guide bar (7) facing the printing site (2);

spring means (12) connecting said second guide rollers (9) to said matrix printing head (1) and resiliently urging said second guide rollers (9) against the opposite side of said guide bar (7) by a force greater than the gravity weight of said matrix printing head (1);

said sliding guide means (14,15) including

a stationary rail (15) connected parallel with said guide bar (7);

groove means (14) on the other end of said matrix printing head (1) from said working end (6); and

tongue means on said rail (15) extending upwardly into sliding engagement in said groove means;

whereby

said second guide rollers (9) supporting the matrix printing head (1) on the guide bar (7);

said first guide rollers (8) transmit to the guide bar (7) the reactive force during printing by the working end (6); and

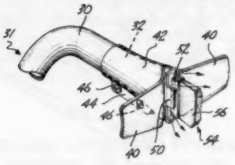
said rail (15) and said tongue and groove means (15,14) securing the matrix printing head (1) against rotation about said guide bar (7).

**4,303,348**

## GUTTER CLEANING DEVICE

**Edward P. O'Brien, 9411 12th NE., Seattle, Wash. 98115**

**Filed Mar. 10, 1980, Ser. No. 128,407**
**Int. Cl.³ A46B *11/02*; A47L *13/03***
**U.S. Cl. 401—137** **3 Claims**




1. A gutter cleaning device for cleaning debris from a gutter, comprising:

(a) a handle including an elongated, substantially vertical conduit which has a reverse bend near one end and which is capable of carrying water under pressure to the gutter to flush loose debris from the gutter;

(b) a scrub brush releasably attached to the end of the conduit so that water exiting the conduit flows immediately around the sides of the brush to aid scrubbing of debris from the gutter; and

(c) two oppositely extending scraper blades which (i) are attached to the conduit above the end so that the water enters the gutter below the blades when the device is postioned in the gutter and (ii) are adapted to scoop loose debris from the gutter.

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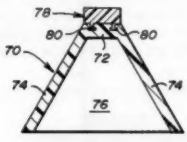
**4,303,349**

## METHOD OF MANUFACTURING ARTICLES

**Albert E. Upton, 7502 Riverbrook, Dallas, Tex. 75230**

**Division of Ser. No. 924,059, Jul. 12, 1978, abandoned. This application May 2, 1980, Ser. No. 146,109**
**Int. Cl.³ E01F *13/00***
**U.S. Cl. 404—6** **1 Claim**




1. A wheel stop barrier for automotive vehicles comprising:

a first member having an inverted v-shaped cross section and including upwardly convergent side walls, a normally horizontally disposed top wall interconnecting the upper ends of the side walls and opposed end walls interconnecting the ends of the top wall and the side walls, said walls defining an enclosed hollow space within said first member;

said first member comprising an integral structure formed entirely from remelted scrap thermoplastic material and therefore being inexpensive to manufacture;

said first member being characterized by sufficient structural rigidity to withstand repeated impact by automotive vehicles without significant change in shape;

said first member being further characterized by a predetermined color;

a second member having a second predetermined color characterized by a high visual contrast with respect to the first predetermined color of the first member so as to increase the visibility of the wheel stop barrier; and

said second member having a predetermined geometrical configuration and being adapted for contact with the molten scrap thermoplastic material that is used to form the first member so that the molten scrap thermoplastic material flows around the predetermined geometrical configuration of the second member to form a mechanical interlock between the first and second members comprising the wheel stop barrier.

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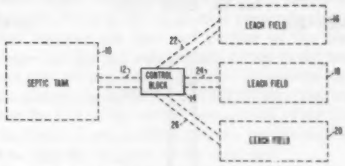
**4,303,350**

## SEPTIC LEACHING SYSTEM

**Stephen P. Dix, 117 E. Stuart, Ft. Collins, Colo. 80525**

**Filed Mar. 20, 1980, Ser. No. 132,253**
**Int. Cl.³ E02B *11/00, 13/00*; B01D *23/16*; F17D *1/08***
**U.S. Cl. 405—36** **14 Claims**




1. A system for leaching septic effluent comprising:

a source of septic effluent;

a first leach field having an input, a porous bed, means for distributing effluent from said input throughout said bed and a layer of wicking material covering the bed and separating the same from the atmosphere;

a second leach field at substantially the same elevation as said first field and having an inlet, a pervious bed, means for distributing effluent from said inlet throughout said pervious bed and a layer of wicking material covering the bed and separating the same from the atmosphere;

and distribution means, having an intake coupled to said source, for selectively feeding said effluent only to said input until the effluent level in said first field reaches a predetermined depth and then responsively and automatically feeding said effluent to said inlet.

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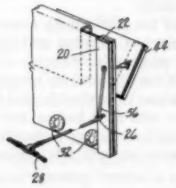
**4,303,351**

## OIL SPILL BARRIERS

**Jerome H. Milgram, Cambridge, Mass., assignor to Offshore Devices, Inc., Peabody, Mass.**

**Filed Feb. 7, 1980, Ser. No. 119,298**
**Int. Cl.³ E02B *15/04***
**U.S. Cl. 405—66** **10 Claims**




1. A barrier assembly comprising an elongated curtain adapted to be deployed on the water and having an oil spill contacting front side and a rear side, ballast means on the lower margin of the curtain, solid flotation means mounted on the rear side only for maintaining the curtain transversely generally erect in the water with its lower edge below the surface of the water including pairs of flotation units each consisting of an upper unit fixedly mounted on the curtain, a lower unit and a median horizontal hinge about which the lower unit is movable between an upper operative position in which it is located rearwardly and generally at the height of the upper unit and a

lower compact stowing position in which the lower unit is generally coplanar with the upper unit and in which the two parts of the flotation means together are coextensive with a substantial part of the curtain width.

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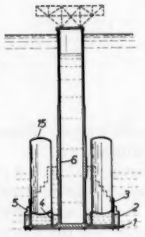
**4,303,352**

## METHOD FOR THE BUILDING AND PUTTING IN PLACE OF A SEA PLATFORM WITH A GRAVITY RESTING BASE, AND MEANS FOR IMPLEMENTING SUCH A METHOD

**Henri A. Marion, London, England, assignor to Compagnie Generale pour les Developpements Operationnels des Richesses Sous-Marines, Paris, France**

**Filed Jun. 25, 1979, Ser. No. 51,858**
**Claims priority, application France, Jun. 26, 1978, 78 19004**
**Int. Cl.³ E02B *17/02***
**U.S. Cl. 405—206** **10 Claims**




1. A method for the building and putting in place of a sea platform with a gravity resting base comprising the following main steps:

(a) building in dry dock of a foundation raft comprising a portion of anti-underwashing walls, circular and radial strengthening walls, buoyancy chamber receptacles and a base forming tower lower portion and water tightening the anti-underwashing walls;

(b) launching the raft;

(c) simultaneously building the walls, a tower and buoyancy chambers, said chambers being built progressively by assembling portions of bodies mounted on a bottom element resting on the chamber receptacle, said assembled portions having a buoyancy adapted to the progressive assembly;

(d) ballasting the chamber receptacles during building of the tower and buoyancy chambers;

(e) closing the upper ends of the buoyancy chambers;

(f) completion of the tower, simultaneously with progressive ballasting thereof;

(g) immersion of the platform by means of ballast;

(h) putting in place of a bridge, and adjusting the draught;

(i) towage to a selected location;

(j) immersion of the platform by means of ballast;

(k) putting in place of a module and ballasting the tower lower portion with solid ballast; and

(l) disconnecting the buoyancy chamber and ballasting the chamber receptacles with solid ballast.

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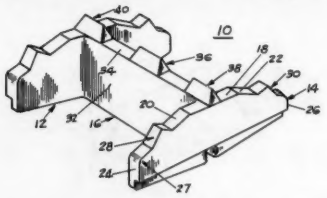
**4,303,353**

## POINT ATTACHMENT FOR FOUNDATION PILE

**John J. Dougherty, Jr., 851 Meadow La., Franklin Lakes, N.J. 07417**

**Filed Jan. 17, 1977, Ser. No. 760,177**
**Int. Cl.³ E02D *5/72***
**U.S. Cl. 405—253** **9 Claims**

1. An improved point for a standard H-beam pile, which includes a web and two flanges, each of said flanges substantially perpendicular to said web and disposed at opposite ends of said web, said flanges each having side portions disposed in spatial relationship with the horizontal, wherein the improvement comprises at least one tooth-like protrusion fixedly secured to at least one of said side portions, said tooth-like protrusion extending substantially downward from said side portion when said pile is in a vertical position, said protrusion including a biting edge for grabbing and holding the rock




stratum upon which the pile is to be supported, said protrusion shaped and disposed upon said side portion such that the forces developed upon contacting said rock stratum are distributed through said corresponding flange towards the webs of said point and H-beam pile.

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**4,303,354**

## MINE ROOF BOLTING

**Guy McDowell, Jr., Marion, Ky., assignor to Peabody Coal Company, St. Louis, Mo.**

**Filed Mar. 28, 1979, Ser. No. 11,067**
**Int. Cl.³ E21D *21/00***
**U.S. Cl. 405—261** **2 Claims**

1. An anchoring means for use in conjunction with a roof bolt plate in supporting the roof of a mine, comprising:

a bolt comprising a shank having a screw thread at only one end thereof extending from adjacent the respective end of the shank for a short distance relative to the length of the shank, a pattern of ridges thereon extending from adjacent the inner end of the screw thread to adjacent the other end of the shank, and a head at said one end of the shank projecting radially outwardly beyond the screw thread and

a nut threaded on the screw thread on the bolt having a recess in its outer face toward the head of the bolt adapted to receive the head therein, and an integral flange at its inner face away from the head of the bolt, the roof bolt plate bearing on the inner face of the flange,

the nut being rotatable relative to the bolt in one direction to move the nut along the bolt away from the head and the nut being rotatable relative to the bolt in the other direc-

tion to move the nut along the bolt toward the head until the nut engages the head with the head received in the recess in the nut, at which point the nut cannot be rotated further relative to the bolt in said other direction so that the application of any torque tending to rotate the nut in said other direction will tend to rotate the nut and the bolt together in said other direction,

whereby the nut may be turned in said other direction to turn the bolt for mixing resin grouting material in a bore in the roof and, after the material has set, turned in said one direction to move the roof bolt plate carried on the flange of the nut into pressurized engagement with the roof for supporting the roof.

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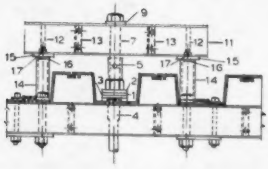
**4,303,355**

## ADJUSTABLE ANCHORED BULKHEAD SYSTEM

**Charles K. Vilcinskas, 769 Dunrobin Ave., Ottawa, Ontario, Canada (K1G 3E5)**

**Continuation of Ser. No. 4,193, Jan. 17, 1979, abandoned. This application Jan. 17, 1980, Ser. No. 112,825**
**Claims priority, application Canada, Feb. 8, 1978, 296469**
**Int. Cl.³ E02D *5/74***
**U.S. Cl. 405—262** **6 Claims**



**1.** An adjustably anchored bulkhead system for retaining soil, having tie rods for holding the bulkhead in place, wherein means are provided for indicating when said tie rods are subjected to excess stresses, said system having provision for relieving the excess stress to allow the movement of the bulkhead while maintaining tension in the tie rods, wherein said means for indicating excess stresses include a replaceable device located between the bulkhead and the end of a tie rod, said device including a brittle component designed to fracture when the tie rod is subjected to excess stress, and a yieldable component which is subjected to stress when said brittle component has fractured and which yields to allow movement of the bulkhead.

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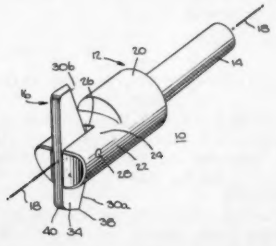
**4,303,356**

## DEBURRING TOOL

**David B. Williams, 106 W. Mechanic St., Corinth, N.Y. 12822**

**Filed Jan. 7, 1980, Ser. No. 110,122**
**Int. Cl.³ B23B *51/16***
**U.S. Cl. 408—187** **2 Claims**



**1.** A tool for deburring the edge of a hole through a platelike workpiece, the edge to be deburred being on the side of the workpiece away from the operator of the tool, and the deburring being in a direction toward the operator of the tool, comprising:

a longitudinal member including a proximal end portion adapted for engagement with means for rotating the longitudinal member about its longitudinal axis, and a cylindrical distal end portion having diameter less than the diameter of the hole and having a transverse slot parallel to the longitudinal axis; and

a cutting blade pivotally mounted in the slot on a pivotal axis perpendicular to the slot and the longitudinal axis, the length of the blade being greater than the diameter of the hole and the depth of the blade being substantially less than the diameter of the hole, the blade being mounted so that when the blade is perpendicular to the longitudinal axis, the opposite first and second end portions of the blade project from opposite sides of the distal end portion;

a first side of the distal end portion perpendicular to the slot and adjacent the first end portion of the blade being shaped so that it is substantially closer to the longitudinal axis than the opposite second side of the distal end portion, the distance between the first side of the distal end portion and the end of the second end portion of the blade when the blade is perpendicular to the longitudinal axis being less than the diameter of the hole; and

the proximal end of the slot adjacent the second side of the distal end portion being located proximally of the pivotal axis so as to allow substantially all of the second end portion of the blade to pivot into the slot so that the tool can be inserted through and withdrawn from the hole when the tool is not being rotated and the blade is thus pivoted into the slot, the proximal end of the slot being further located so as to contact the second end portion of the blade when the blade is pivoted into the slot to prevent the second end portion of the blade from passing all the way through the slot, the mass of the blade being distributed so that when the blade is pivoted into the slot with the second end portion of the blade in contact with the proximal end of the slot, rotation of the tool about its longitudinal axis produces centrifugal forces on the blade which pivot the blade out of the slot perpendicular to the longitudinal axis of the tool, the distance between the first side of the distal end portion and the end of the second end portion of the blade when the blade is perpendicular to the longitudinal axis being small enough so that when the tool is not rotating about its longitudinal axis and the first side of the distal end portion is placed in contact with the side of the hole, the first end portion of the blade contacts the side of the hole and the blade can be pivoted into the slot by this contact so that the tool can be withdrawn from the hole.

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**4,303,357**

## QUICK-CHANGE HOLE SAW MANDREL

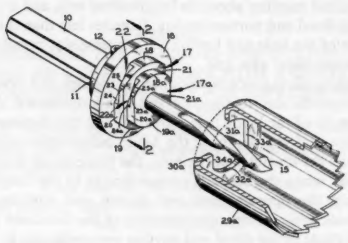
**William Makar, 10849 NE. 3rd Ct., Miami, Fla. 33161**

**Filed May 19, 1980, Ser. No. 151,417**
**Int. Cl.³ B23B *41/02, 31/44, 5/22***
**U.S. Cl. 408—204** **6 Claims**

**1.** For use with a hole saw having a cylindrical body with a circular series of saw teeth at one end and an opposite end wall with an oblong central opening therein, a quick-change mandrel for attaching said hole saw to an electric drill, said mandrel having a shank for reception in the chuck of an electric drill and having a locking segment on its front end, said locking segment having an oblong front end which is complementary to said oblong central opening in the hole saw for slidably passing said end wall of the hole saw rearward over said locking segment, said locking segment having peripheral grooves therein behind its oblong front end into which said end wall of the hole saw may be turned for locking engagement with said locking segment after being slid rearward over said locking segment,

the improvement wherein:

each of said peripheral grooves has a tapered configuration near the end of that groove toward which the end wall of the hole saw is turned for locking engagement



with the locking segment, whereby said end wall is wedged tightly in each groove because of the latter's tapered configuration.

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**4,303,358**

## BORING TOOL WITH A PLURALITY OF CUTTER CHIPS

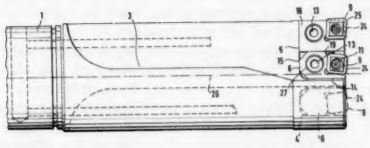
**Arnold Grusa, Ammerbuch-Entringen, Fed. Rep. of Germany, assignor to Montanwerke Walter GmbH, Tübingen, Fed. Rep. of Germany**

**Filed Jun. 10, 1980, Ser. No. 158,216**

**Claims priority, application Fed. Rep. of Germany, Jun. 30, 1979, 2926462**

**Int. Cl.³ B23B *51/00*; B26D *1/12***

**U.S. Cl. 408—223** **9 Claims**



1. Boring tool having an elongated tool holder body (1, 2) having a cutting end portion formed with chip removal flutes (3),

a plurality of cutter chips (9) located at the cutting end portion of the tool body and having main cutting edges (24) extending essentially transversely to the axis of the tool body;

chip holder plates (6, 16, 16*a*) located at, and removably secured to, the cutting end portion of the body, and having cutter chips, each, removably secured thereto.

the main cutting edges being positioned across the diameter of the tool in overlapping relation in which the radially innermost chip has a cutting edge extending over the axis of the tool body, and the radially outermost chip has a cutting edge defining the cutting diameter,

wherein, in accordance with the invention,

at least the chip holder plate (16, 16*a*) carrying the radially outermost chip, and the next adjacent chip holder plate (6) carrying a radially more inwardly positioned chip, have mutually engaged, common abutment surface (19, 27);

the body (1) is formed with a recess (5) in which said radially outermost chip holder plate and the next adjacent plate are commonly secured;

and wherein all radially inwardly positioned chip holder plates (6) are of equal size, the boring or drilling diameter being defined by the width of the radially outermost chip holder plate and the chip thereon.

**4,303,359**

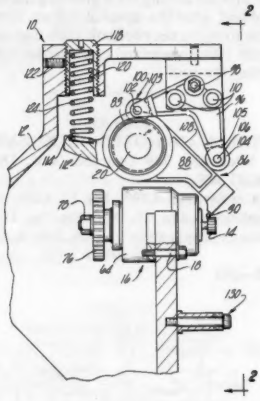
## DEBURRING APPARATUS

**Raymond F. Nixon, 760 Orion Apt. 232, Lake Orion, Mich. 48035, and Gaitskill S. Barr, 25800 Meadowdale, Franklin, Mich. 48025**

**Filed Jun. 8, 1979, Ser. No. 46,814**

**Int. Cl.³ B23F *19/10***

**U.S. Cl. 409—9** **9 Claims**



1. Apparatus for deburring a gear comprising:

a frame;

means for mounting a gear to be deburred to said frame;

means for indexing a gear held by said mounting means between preselected rotational positions;

a cutting tool means;

means synchronized with said indexing means for moving said cutting tool means into working engagement with a gear held by said mounting means, said moving means further comprising an eccentric member and a cam having a cam surface;

means for rotating said eccentric member and said cam in synchronism with said indexing means;

means for rotatably connecting said eccentric member to said cutting tool means;

means responsive to said cam surface of said cam for moving said cutting tool means in conjunction with said eccentric member and

wherein said cam surface responsive means further comprises a bell crank, means for pivotally mounting said bell crank at a midpoint to said frame, cam follower means attached to said bell crank for engaging the cam surface of said cam so that said bell crank pivots about said pivot means in dependence upon said cam surface, and means for imparting the pivotal action of the bell crank to said cutting tool means.

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**4,303,360**

## POWER DRAWFINGER SYSTEM FOR MACHINE TOOL SPINDLE

**Donald J. Cayen, and John T. Janeczko, both of Fond du Lac, Wis., assignors to Giddings & Lewis, Inc., Fond du Lac, Wis.**

**Filed Feb. 29, 1980, Ser. No. 125,860**

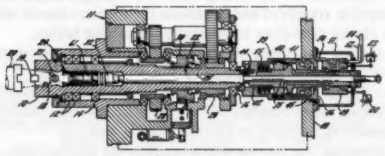
**Int. Cl.³ B23B *5/26, 31/10***

**U.S. Cl. 409—233** **10 Claims**

1. A power drawfinger system for releasably securing a tapered shank toolholder in the correspondingly tapered socket of a machine tool spindle, the toolholder having a gripping knob on its tapered end, said system comprising, in combination,

(a) a headstock;

(b) a spindle journaled within said headstock, said spindle having an axial bore therein;
(c) a power drawbar slidably but non-rotatably mounted within said spindle;
(d) an actuating shaft disposed in axial alignment with said spindle, said shaft being connected to said spindle for rotation in unison therewith;
(e) means defining a counterbore adjacent the outer end of said spindle communicating with said spindle socket;



(f) a guide boss on said drawbar;
(g) an annular land on said drawbar spaced from said guide boss;
(h) a preventer flange on said drawbar spaced from said annular land; and
(i) a collet device comprising a plurality of individual fingers, each finger having an internal safety flange adapted to fit between said annular land and said preventer flange.

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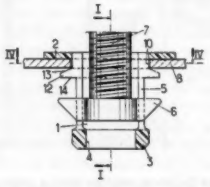
**4,303,361**

## DEVICES FOR FIXING OBJECTS TO METAL PLATES ACCESSIBLE FROM ONLY ONE SIDE

**Richard Moryl, Maisons-Laffitte, and Roger Bouery, Valmondois, both of France, assignors to C.O.M.E.T. Compagnie de Material et d'Equipement Techniques, Senlis, France**

**Filed Mar. 6, 1980, Ser. No. 127,548**
**Claims priority, application France, Mar. 7, 1979, 79 05883**
**Int. Cl.³ F16B *37/04***
**U.S. Cl. 411—108** **6 Claims**



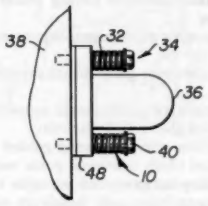
1. A device for fixing an object by screwing it to at least one blind plate or similar support having a mounting slit extending therethrough with parallel edges of width a, comprising two independent screwing elements adapted to cooperate with one another, the first of which comprises a cage made from a plastic material formed by a cylindrical socket extended by a radial collar, said socket having, on the one hand, at all its points in a transverse direction a dimension at most equal to a and, on the other hand, axailly in the immediate vicinity of said collar a groove which extends along a geometric closed line inscribed in a square whose side is equal to a, this line comprising two opposite corners of said square and the two half-sides extending from each of these two corners, wherein the first screwing element comprises further a threaded metal part housed in the cage and wherein the closed line comprises further two opposite arcs of a circle of radius a/2, centred at the centre of the square, extending respectively from the two opposite ends of said two half-sides which are perpendicular to said transverse direction, the end of each arc of a circle the furthest removed from the middle of the side of the square where this arc originates being connected to an eccentric boss.

**4,303,362**

## COIL WOUND SPACER

**David A. Lockhart, Bartonville, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**PCT No. PCT/US79/00260, § 371 Date Apr. 23, 1979, § 102(e) Date Apr. 23, 1979, PCT Pub. No. WO80/02274, PCT Pub. Date Oct. 30, 1980**
**PCT Filed Apr. 23, 1979, Ser. No. 85,645**
**Int. Cl.³ F16B *39/24, 43/00***
**U.S. Cl. 411—153** **5 Claims**




1. A spacer (10) comprising:
a spiral wound coil (12) having a cylindrical body (20), a substantially continuous annular inner surface (28), and an annular outer surface (22);
a first portion (26) of each spiral (14) abutting in full surface abutment each adjacent spiral (14), said first portion (26), being adjacent said inner surface (28); and
a second portion (30) of each spiral (14) being free of contact with each adjacent spiral (14), said second portion (30) being adjacent said outer surface (22).

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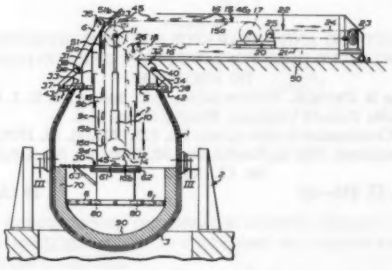
**4,303,363**

## WORK FACILITATING APPARATUS FOR CONVEYING BUILDING MATERIAL FROM A HIGHER TO A LOWER LEVEL

**Carl G. Cervin, Malmö, Sweden, assignor to Cervinter AB, Malmö, Sweden**

**Filed Oct. 24, 1978, Ser. No. 954,174**
**Claims priority; application Sweden, Oct. 31, 1977, 7712256**
**Int. Cl.³ E04G *21/14*; F27D *1/16***
**U.S. Cl. 414—10** **15 Claims**



1. An apparatus for conveying material from a higher level to a lower level through an upper opening in a metallurgical container, such as a converter, a metallurgical furnace or a holding furnace, particularly material in the form of bricks for providing the metallurgical container with a refractory lining, said apparatus comprising:
a vertically suspended structure formed of plural relatively vertically telescopically movable sections;
a working platform supported by said structure at a lower said section thereof;
an upper frame including means for supporting said upper frame to the upper end of the metallurgical container and

means for supporting said structure and said platform in a manner to depend from said upper frame downwardly into the metallurgical container;

an outer support means extending from a position outside of said upper frame to said upper frame, said outer support means including an elongated guide means;

a movable supporting device supported by said outer support means for adjustable movement along said elongated guide means, said movable supporting device being adjustably positionable at plural fixed locations relative to said elongated guide means;

an endless chain conveyor having plural material entrainment means;

first chain conveyor guide means supported by said movable supporting device;

second chain conveyor guide means supported by said upper frame;

third chain conveyor guide means supported by said structure at a level above said platform;

said endless chain conveyor being guided by said first, second and third chain conveyor guide means in an endless path extending between said movable supporting device and said upper frame and therefrom vertically into and through said structure to said level above said platform, the vertical portion of the conveyor loop of said endless chain conveyor between said second and third chain conveyor guide means being elongatable and shortenable by movement of said movable supporting device and said first chain conveyor guide means along said elongated guide means; and

means for transferring material from outwardly of the metallurgical container to said endless chain conveyor at a position located above the metallurgical container and above said vertical portion of said endless chain conveyor, said transferring means including a transportation path extending from a first location positioned outwardly of and adjacent a first part of said vertical portion of said endless chain conveyor which during operation moves vertically upwardly between said third chain conveyor guide means and said second chain conveyor guide means to a second location at a level for transferring material over said second chain conveyor guide means to a second part of said vertical portion of said endless chain conveyor which during operation moves vertically downwardly between said second chain conveyor guide means and said third chain conveyor guide means.

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**4,303,364**

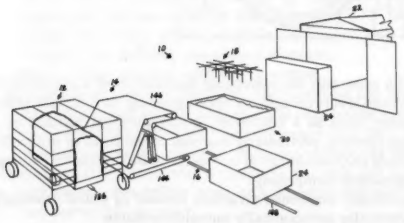
## METHOD AND APPARATUS FOR TRANSFERRING HARVESTED BULK FOLIAGE FROM ONE CONTAINER TO ANOTHER

**Jesse R. Pinkham, Winston-Salem, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.**

**Continuation-in-part of Ser. No. 925,722, Jul. 18, 1978, abandoned. This application Jan. 30, 1980, Ser. No. 116,699**

**Int. Cl.³ A24B *1/06***

**U.S. Cl. 414—26** **16 Claims**



1. A method of transferring a pile of uncured tobacco leaves from a field trailer of a mechanical harvester into a curing barn utilizing a trailer unloading mechansim, distribution conveyor system and a container handling system comprising the steps of:

(a) locating the field trailer carrying the pile of tobacco leaves adjacent to a trailer unloading mechanism;

(b) operating the trailer unloading mechanism to engage and suspend the pile of tobacco leaves;

(c) removing the field trailer from beneath the pile of suspended pile of tobacco leaves;

(d) selectively depositing the tobacco leaves on said distribution conveyor mechanism with a bottom-to-top sequence;

(e) concurrently operating said conveying mechanism to receive, transport and distribute the tobacco leaves within a curing container in generally horizontal layers;

(f) spiking the tobacco leaves in the curing container to retain them in said generally horizontal layers;

(g) rotating the curing container with the container handling system approximately 90° so that the tobacco leaves are generally oriented in vertical planes; and

(h) inserting the curing container into the curing barn.

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**4,303,365**

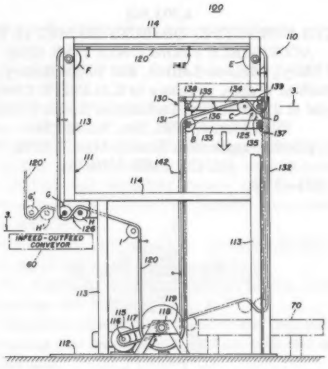
## CONTINUOUS CHAIN STACKER/UNSTACKER

**Maynard R. Euverard, Williamsburg, Va.; Henry A. Heide, Addison, and James J. Diver, South Holland, both of Ill., assignors to Velten & Pulver, Inc., Chicago Ridge, Ill.**

**Filed Oct. 5, 1977, Ser. No. 839,456**

**Int. Cl.³ B65G *57/02, 59/02***

**U.S. Cl. 414—37** **14 Claims**




1. A machine for feeding articles into a stack and/or removing articles from a stack, said machine comprising a continuous conveyor for conveying articles to the top of the stack and away from the top of the stack, said conveyor comprising two laterally spaced-apart parallel endless conveyor members each having a pivot fixed thereon for movement therewith, said conveyor members being respectively movable along parallel paths including transfer portions respectively defining arcs of equal parallel circles, the axes of said pivots being spaced apart and parallel so as to define a plane which remains in a predetermined fixed orientation with respect to the horizontal and the vertical as said conveyor members move along the paths, said axes being parallel to the axes of said circles and respectively spaced from said conveyor member paths a distance equal to the radii of said circles in directions so as to be respectively coaxial with said circles when the adjacent parts of said conveyor members are in said transfer portions of said paths, and an article carrier supported by and between said conveyor members for pivotal movement only with respect to the pivot axes, said carrier including support means movable between a support condition for supporting an associated article thereon and a release condition for releasing the associated article, said transfer portions of said conveyor member paths being dis-

posed adjacent to the top of a stack so that as the parts of said conveyor members adjacent to said carrier move through said transfer portions of said paths said carrier and any article supported thereby remain stationary in a transfer position at the top of a stack, and control means for causing said support means to move between the support and release conditions thereof when said carrier is in the transfer position for depositing a conveyed article on the top of the stack or picking up an article from the top of the stack, whereby said carrier is stably held in a fixed position with respect to said plane for only translational movement with respect to said conveyor members along the paths.

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**4,303,366**

## METHOD AND APPARATUS FOR UNLOADING ROD-LIKE ARTICLES FROM CONTAINERS

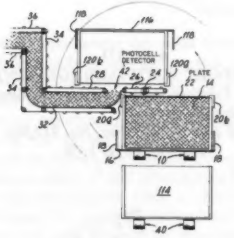
**Dennis Hinchcliffe, and George C. Leigh, both of London, England, assignors to Molins Limited, London, England**

**Filed Nov. 29, 1977, Ser. No. 855,775**

**Claims priority, application United Kingdom, Dec. 3, 1976, 50439/76**

**Int. Cl.³ B65G *65/23***

**U.S. Cl. 414—419** **13 Claims**




1. Apparatus for unloading trays of rod-like articles, comprising a tray carrier for receiving a tray which is capable of holding at least one stack of rod-like articles arranged with their lengths parallel; the tray carrier being rotatable, about an axis parallel to the lengths of the rod-like articles in a tray supported by the carrier, between a first position at which the tray carrier can receive a tray in a substantially upright position and a second position at which a tray held by the carrier is at least partially inverted; and delivery means for moving away rod-like articles unloaded from a tray when the carrier is in the second position, the delivery means including means rotatable with the carrier from said first position towards said second position and subsequently revolvable relative to said carrier to direct articles from said tray towards an opening which is at least partly defined by said means rotatable with the carrier and which is at least approximately centrally disposed relative to the stack of articles unloading from said tray, wherein the means rotatable with the carrier and subsequently rotatable relative to the carrier includes an endless conveyor band.

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**4,303,367**

## AUTOMOBILE SHOPPING BAG CONTAINER

**John A. Bott, 931 Lake Shore Dr., Grosse Pointe Shores, Mich. 48236**

**Filed May 15, 1979, Ser. No. 39,392**

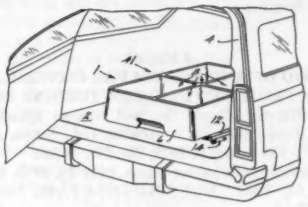
**Int. Cl.³ B60R *9/06***

**U.S. Cl. 414—522** **9 Claims**

1. A container for holding shopping bags in an upright position for transportation in an associated vehicle comprising:

a box member having a plurality of open topped receptacles, each of said receptacles being adapted to receive and provide lateral support for a loaded grocery bag and having a generally rectangular parallelepiped outer shape with generally vertically oriented end walls and side walls; a flange extending horizontally from the bottom portion of each of said side walls;

means for movably supporting said box member between first and second positions along the horizontal surface of an associated vehicle, comprising a pair of longitudinally elongated, parallel rails, each having a channel along the



laterally outer edge thereof facing toward and adapted to slideably receive a flange of one of said side walls,

means disposed at said flange for controlling and limiting vertical and lateral movement of said flange within the channel; and

spring biased adaptor means for removably fixedly securing said rails to said vehicle.

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**4,303,368**

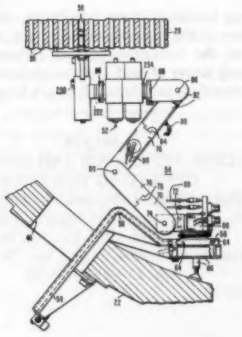
## REMOTE DOCKING APPARATUS

**Thomas H. Dent, Greensburg; Wayne C. Sumpman, N. Huntingdon, and John J. Wilhelm, New Kensington, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Sep. 18, 1978, Ser. No. 943,506**

**Int. Cl.³ B65G *47/90***

**U.S. Cl. 414—590** **5 Claims**



1. Remote docking apparatus that remotely attaches a remote access manipulator to a tube sheet in a nuclear steam generator comprising:

a support plate;

a plurality of camlocks attached to said support plate, said camlocks being disposed in tubes of said tube sheet for substantially fixedly suspending said support plate from said tube sheet;

an upper housing attached to said support plate;

a lower housing vertically slidably disposed over said upper housing and being capable of limited horizontal rotational movement with respect to said upper housing;

an attachment mechanism disposed on said lower housing, said attachment mechanism holding said remote access manipulator when said lower housing is moved vertically thereby attaching said remote access manipulator to said

tube sheet and allowing said remote access manipulator to detach from said attachment mechanism and to traverse said tube sheet;

drive means disposed in said upper housing and connected to said lower housing for vertically moving said lower housing with respect to said upper housing; and

switch means mounted on said upper housing and on said lower housing for automatically controlling the vertical movement of said lower housing with respect to said upper housing.

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**4,303,369**

## METHOD OF AND SYSTEM FOR CONTROLLING STRESS PRODUCED IN STEAM TURBINE ROTOR

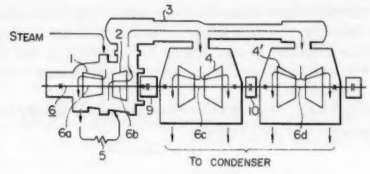
**Katsukuni Hisano; Hitoshi Isa, and Hazime Sibaoka, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 8, 1979, Ser. No. 36,985**

**Claims priority, application Japan, May 10, 1978, 53-56082**

**Int. Cl.[3] F01K *13/02*; F01D *21/14, 17/00, 19/00***

**U.S. Cl. 415—1** **11 Claims**




1. In a method of controlling stress produced in a rotor of a steam turbine during operation of said turbine, said method comprising the steps of:

determining thermal and rotational conditions of said rotor;

calculating thermal and centrifugal stresses produced in said rotor from said thermal and rotational conditions, respectively;

calculating brittle fracture toughness under said thermal condition of the material of said rotor, and

controlling the operation of said turbine to prevent the combined stress of said thermal and centrifugal stresses from exceeding said brittle fracture toughness.

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**4,303,370**

## CONTROL APPARATUS AND METHOD OF OPERATING THE SAME

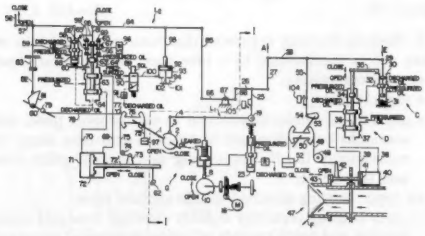
**Takao Kuwabara; Hisaya Uchiyama, and Hiroshi Okumura, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 30, 1979, Ser. No. 34,603**

**Claims priority, application Japan, Apr. 29, 1978, 53/52094**

**Int. Cl.[3] F01B *25/00***

**U.S. Cl. 415—17** **18 Claims**



1. In a control apparatus of the type including a primary control unit, including wicket gates of a hydraulic turbine, capable of taking variable operative positions, and a secondary control unit, including a bypass valve operable to control an amount of bypass flow in response to the opening and closing of said wicket gates operable in accordance with the operative positions of said primary control unit, said apparatus comprising:

first signal transmitting means for detecting the operative position of said primary control unit and transmitting the corresponding positional signal to said secondary control unit,

said primary control unit including a power amplification servo-motor at the final stage thereof,

second signal transmitting means for detecting the changing rate with respect to time of the operative position of said primary control unit and transmitting the corresponding differential signal to said secondary control unit,

said second signal transmitting means not detecting exact operative position of said final stage servo-motor but detecting motion of its command signal yielding or generating unit upstream of said servo-motor, and

means for modifying said differential signal when it is detected that the motion of said servo-motor of said primary control unit is mechanically or hydraulically restricted.

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**4,303,371**

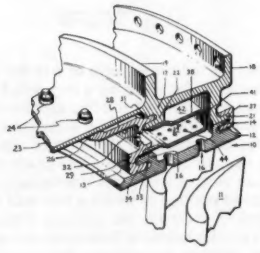
## SHROUD SUPPORT WITH IMPINGEMENT BAFFLE

**Terry T. Eckert, Fairfield, Ohio, assignor to General Electric Company, Cincinnati, Ohio**

**Filed Jun. 5, 1978, Ser. No. 912,904**

**Int. Cl.[3] F01D *5/08***

**U.S. Cl. 415—116** **12 Claims**



1. An improved turbine blade shroud support apparatus of the type having a support structure partially defining a cooling air plenum and providing support for a plurality of segmented shrouds located radially inward thereof with the cooling air plenum including leakage paths for relatively high pressure cooling air therein to leak therefrom without cooling the shroud where one of said leakage paths is between adjacent ones of said segmented shrouds and a second one of said leakage paths is between said segmented shrouds and said support structure, wherein the improvement comprises:

a perforated impingement baffle attached to the support structure to define the remaining portion of the cooling air plenum and provide for the impingement of cooling air on the shroud wherein the cooling air plenum provided by the support structure and the perforated impingement baffle comprises a relatively high pressure plenum which is relatively free of said leakage paths such that relatively high pressure air passes through the perforated impingement baffle providing the impingement of cooling air on the shroud and wherein the relatively low pressure impinged air may then flow along said first and second leakage paths.

4,303,372

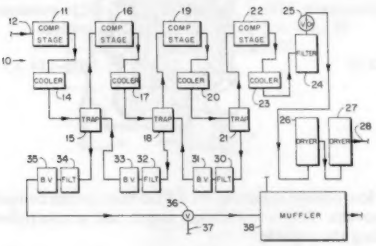
## BLEED VALVE PARTICULARLY FOR A MULTI-STAGE COMPRESSOR

Terence Caffrey, Kent, Ohio, assignor to Davey Compressor Company, Cincinnati, Ohio

Division of Ser. No. 927,669, Jul. 24, 1978, Pat. No. 4,186,767, and a continuation of Ser. No. 820,208, Jul. 29, 1977, abandoned, which is a division of Ser. No. 644,539, Dec. 29, 1975, abandoned. This application Aug. 27, 1979, Ser. No. 69,737

Int. Cl.[3] F01D *11/08*

U.S. Cl. 415—121 A 16 Claims




1. A multi-stage compressor for a gas having a plurality of compressor stages, each of said compressor stages increasing the pressure of the gas from the prior stage, non-electrical means disposed between at least one adjacent pair of said stages to remove moisture in the compressed gas from the entrance side of the higher pressure stage of said adjacent stages to an ambient having the pressure of the entrance side of the lower pressure stage of said adjacent stages and at a pressure greater than atmospheric without affecting the pressure differential between the entrance sides of said adjacent stages, and means to prevent the return of the removed moisture to the entrance side of any of said compressor stages having its ambient at a pressure greater than atmospheric.

4,303,373

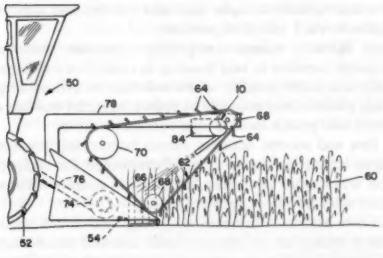
## DEVICE FOR GENERATING A CURTAIN OF HIGH VELOCITY GAS

William B. Polhemus, 240 Madrona Ave., Belvedere, Calif. 94920

Filed Jul. 25, 1979, Ser. No. 60,412

Int. Cl.[3] F04D *29/40;* A01D *41/12;* A01F *12/48*

U.S. Cl. 415—206 5 Claims



1. A blower device for producing a relatively wide but thin stream of air comprising:

an elongated, hollow body having an end wall closure at one end, an open inlet at its other end and an elongated slot opening extending longitudinally between said ends;

means for forcing a constant flow of air into said open inlet of said body;

a flat, relatively narrow nozzle section covering said slot, fixed to and extending tangentially from one side of said body;

an air deflecting means within said body for causing air to flow into a helical pattern before passing through said slot opening, said air deflecting means comprising a series of fixed, spaced apart, twisting vanes within said body for deflecting the axially flowing air into a spiral flow pattern;

straightening means in said nozzle section for causing air flowing from said slot opening to flow from the outlet of said nozzle section along a line perpendicular to the longitudinal axis of said body at a substantially even flow rate along said outlet of the nozzle section.

4,303,374

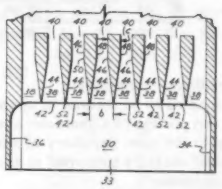
## FILM COOLED AIRFOIL BODY

Bruce T. Braddy, Boxford, Mass., assignor to General Electric Company, Lynn, Mass.

Filed Dec. 15, 1978, Ser. No. 969,914

Int. Cl.[3] F01D *5/18*

U.S. Cl. 416—97 R 1 Claim



1. For use in a gas turbine engine having a hot gas stream flowing therein, a film cooled airfoil body comprising:

a radially and axially airfoil body having leading and trailing edge portions and a pair of spaced-apart walls including axially and radially extending concave and convex exterior wall surfaces;

a radially extending interior cavity disposed between said spaced-apart walls, said cavity adapted to receive cooling air from a source of pressurized air;

a tapered recess disposed in said airfoil body, for carrying a film of cooling air, and comprising a part of one of said exterior wall surfaces at said trailing edge portions, said recess extending substantially radially across said airfoil body and tapering in the downstream direction to provide a recess depth which decreases in the downstream direction, said recess at least partially defined at its most upstream end by a face extending radially substantially across said airfoil body and facing in the downstream direction and further defined by a radially and axially extending recess bottom surface facing said hot gas stream and comprising a part of said one exterior wall surface;

a plurality of radially spaced-apart adjacent cooling passages each having an inlet communicating said passages with said cavity and an exit at said radially extending face, said passage exits providing for the discharge of said cooling air in a thin continuous film along said bottom surface, said film providing a barrier between said bottom surface and said hot gas stream, said passage exit having an exit width of a preselected magnitude; and

a plurality of axially extending partitions each disposed between adjacent cooling passages and extending from said cavity to said recess and terminating a knife-like edge co-planar with said radially extending face, each of said partitions further including a pair of generally oppositely facing spaced-apart passage wall surfaces defining at least a portion of adjacent passages, said pair of wall surfaces having a spacing width which decreases from a first upstream magnitude at said inlet to a second downstream magnitude at said knife-like edge, said decreasing spacing width providing for tapering of said partition over a substantial portion of said axial extent thereby permitting said

passages to discharge cooling air in a film without the presence of wakes.

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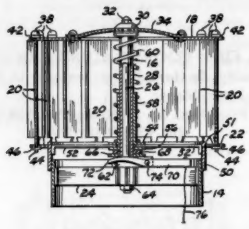
4,303,375

## CLOSABLE VANE TURBINE VENTILATOR

Robert M. Foglesong, 3115 Del View, Del City, Okla. 73115, and Terry D. Arden, 5009 Lunow, Oklahoma City, Okla. 73135

Filed May 2, 1980, Ser. No. 145,931
Int. Cl.[3] F01D 7/00
U.S. Cl. 416—167 3 Claims



1. A turbine ventilator, comprising:

a tubular skirt adapted to be secured in upstanding relation to the upper end portion of a ventilator shaft, or the like;

a spider secured to the inner periphery of said skirt;

an upstanding shaft coaxially supported at its depending end portion by said spider;

a horizontally disposed disk-like rain plate coaxially journalled by the upper end portion of said shaft for angular rotation;

a moveable plate-like ring horizontally surrounding said shaft above said skirt for vertical movement toward and away from said rain plate,

said moveable ring having a depending flange telescopically surrounding the outer periphery of the upper end portion of said skirt and having radial inwardly projecting spokes;

superposed clamp rings vertically slidably surrounding said shaft and impinging the inwardmost end portions of said spokes;

a plurality of panel-like vanes extending vertically in circumferentially spaced relation between corresponding peripheral edge portions of said rain plate and said moveable ring in a like plurality of respective planes normally substantially tangential to a cylindrical plane generated by the periphery of said skirt,

each said vane having a longitudinally extending tab centrally formed on its respective end forming upper and lower sets of tabs,

each tab of at least one set of tabs having a quarter twist about its longitudinal axis to form opposing cam surfaces,

said rain plate and said moveable ring each having a row of circumferentially spaced-apart apertures disposed in cooperative relation for receiving the respective upper and lower sets of tabs,

at least one row of said rows of apertures comprising vertical slots for receiving said set of quarter twisted tabs and slidably engaging said tab cam surfaces;

a plurality of fasteners connected with the end of each tab of said sets of tabs projecting through said rain plate and said moveable ring, respectively; and,

lever means interposed between said moveable ring and said skirt and secured to said shaft for lifting said moveable ring toward said rain plate,

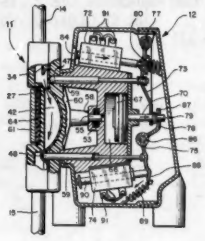
at least one set of said sets of tabs angularly rotating said plurality of vanes in unison through an arc of predetermined magnitude in response to movement of said moveable ring toward said rain plate.

4,303,376

## FLOW METERING CASSETTE AND CONTROLLER

Rem Siekmann, Barrington, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jul. 9, 1979, Ser. No. 55,898
Int. Cl.[3] A61M 5/00; F04B 9/12, 43/06
U.S. Cl. 417—360 8 Claims



1. Flow control apparatus for a fluid flow system comprising a removable flow controlling cassette and a controller for actuating the cassette,

said cassette comprising:

a control conduit;

an inlet conduit and an outlet conduit, said inlet and outlet conduits including respective valve portions closable in response to an applied mechanical force;

metering means comprising a metering chamber in fluid communication with said inlet and outlet conduits and having a volume dependent on an applied pressure effect in said control conduit;

said controller comprising:

a housing defining means for receiving the cassette in an operating position;

an actuator conduit;

means comprising a cylinder and piston assembly in said housing in pressure communication with said actuator conduit, said piston being movable between first and second positions within said cylinder to produce a pressure control effect in said actuator conduit, said piston assembly including a piston rod;

pressure seal means for forming a separable pressure seal between said actuator conduit and said cassette control conduit when the cassette is in said operating position;

first actuator means comprising a first mechanical actuator member in said housing in operative engagement with said inlet conduit when said cassette is in said operating position and actuable to open said inlet conduit and move said piston toward said first position;

second actuator means comprising a second mechanical actuator member in said housing in operative engagement with said outlet conduit when said cassette is in said operating position and actuable to open said outlet conduit and move said piston toward said second position,

said first and second actuator means comprising respective valve actuator members slidably mounted for reciprocation within said controller housing for operative engagement with said valve portions,

said valve actuator members actuating said valve portions closed except on actuation of said first and second actuator means when said cassette is in said operating position,

said first and second actuator members being engaged to said piston rod,

said first actuator member being pivotally mounted to said housing at one end, and engaged to said piston rod at its other end, and operatively engaged to said inlet valve actuator member intermediate said ends, and said second actuator arm being engaged to said piston rod at one end, operatively engaged to said outlet valve actuator rod at its

other end, and pivotally mounted to said housing intermediate its ends, and

metering control means for alternately actuating said first and second actuator members and said piston whereby said inlet and outlet conduits are alternately opened and closed and said metering chamber is alternately expanded and contracted to pump fluid through the system.

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**4,303,377**

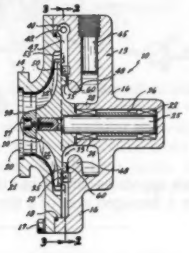
## TURBINE-COMPRESSOR EJECTOR

**Everett H. Schwartzman, 2751 Toledo St., Torrance, Calif. 90503**

**Continuation of Ser. No. 875,115, Feb. 3, 1978, abandoned. This application Dec. 10, 1979, Ser. No. 102,129**

**Int. Cl.³ F04B** *17/00, 35/00*

**U.S. Cl. 417—406** **23 Claims**



1. In a system for use with a fluid at one energy level and a fluid at a higher energy level, an improved turbine-compressor-ejector turbomachine device for increasing the pressure of the fluid of said one energy level by an energy exchange with the energy of the fluid of the higher energy level comprising:

means forming a source of fluid at said higher energy level,

means forming a housing,

a compressor and turbine positioned in said housing,

said turbine and compressor being interconnected in said housing for rotation together,

bearing means supported within said housing for rotatingly supporting said compressor and turbine,

said housing including an inlet for flow therethrough of the fluid at said one energy level,

said compressor being mounted in said housing for receiving flow of the fluid at said one energy level for flow thereof through the compressor,

said housing including an ejector inlet opening connected to receive flow therethrough of fluid at the higher energy level to effect increase in the mass flow through said turbine as compared to the mass flow through said compressor,

said turbine being mounted in said housing for rotation with said compressor and receiving flow of all of the fluid from said compressor and all of the fluid from said ejector inlet opening,

means in said housing forming an outlet for discharging the fluid leaving said turbine, and

means in said housing forming a mixing region free of combustion between said fluids to receive flow of fluid from said compressor and from said ejector inlet opening to effect an increase in the total energy of the fluid from said compressor by admixing the fluid flow from said compressor with the fluid flowing through said ejector inlet opening.

18. The method of increasing the pressure of fluid at one energy level by an energy exchange with a fluid at a higher energy level by flowing said fluids through a turbo-machine including a compressor driven by a turbine and wherein there is a mixing region therebetween which includes an ejector cooperating with said mixing region and compressor and turbine comprising the steps of:

flowing the fluid at one energy level into said compressor for flow through said compressor into said mixing region,

flowing said fluid at said higher energy level through said ejector and into said mixing region to effect an energy exchange between the two fluids by a momentum exchange and to provide a flow of mixed fluids whose energy is greater than the energy flowing through said compressor,

flowing said mixed fluids through said turbine to drive said turbine and to provide an output fluid whose pressure is greater than the pressure of the fluid at said one energy level, and

the volume flow of the fluid of said one energy level exceeding the volume flow of the fluid at said higher energy level.

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**4,303,378**

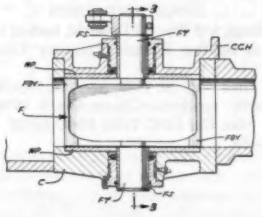
## CONCRETE PUMP

**John Hunter, Torrance, Calif., assignor to Thomsen Equipment Company, Gardena, Calif.**

**Continuation of Ser. No. 835,514, Sep. 22, 1977, abandoned. This application Jun. 25, 1979, Ser. No. 51,689**

**Int. Cl.³ F04B** *7/02*

**U.S. Cl. 417—517** **10 Claims**



1. An apparatus for pumping moist compressible materials such as plaster, concrete, mortar and the like including

first and second pumping units,

an enclosed material housing having a preselected outer configuration and a substantially cylindrical material chamber constructed and defined internally thereof, said housing including material inlet means and material discharge means communicating with the material chamber,

means for charging the material chamber with the material to be pumped through the material inlet means,

said material chamber inlet means including means for placing each of the pumping units in communication with the material chamber,

a material valve element rotatably mounted within the material chamber and extending into sliding engagement with the chamber wall for controlling the flow of material at the inlet means and the discharge means so as to subdivide the chamber for alternately allowing the subdivided portions to function with the pumping units as a means to charge the material therein and to discharge the material therefrom, the valve element being arranged in the chamber relative to the inlet means and the discharge means so as to isolate the portion of the chamber discharging material from communication with the charging means but in communication with said chamber material discharge means, said material housing having a removable cover for exposing the valve element, said valve element being removable from the housing when the cover is removed to expose the valve element, the material housing further including wear means comprising a wear plate secured to the side of the housing opposite to the cover and a wear plate secured to the chamber side of the cover for the valve element to rotate on,

the valve element being further characterized as a blade element having aligned trunnions and rotatably mounted thereby and within the blade element having oppositely contoured concave faces for mating with the opposed arcuate walls of the cylindrical chamber for defining conduit-like opening through the material chamber to minimize any tendency for the moist compressible material to be restricted in its flow through the material chamber when being conveyed through the chamber to the material discharge means, said aligned trunnions extend outwardly from opposite longitudinal edges of said blade element and each said trunnion being arranged substantially centrally of the longitudinal edges of said blade element and coaxial with one another so as to be constructed and defined as one piece with the blade element of the valve element, said contoured faces of the blade element being further characterized as having concavities of a preselected depth defined within the preselected perimeter of the blade element spaced inwardly of the edges of the lateral faces of the blade element to have a shallow "C" cross-section, and

automatic means for operating said pumping units and for changing the position of said valve element in a preselected timed relationship.

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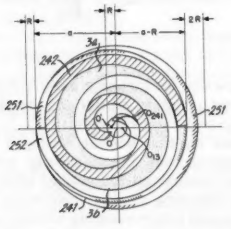
**4,303,379**

## SCROLL-TYPE COMPRESSOR WITH REDUCED HOUSING RADIUS

**Masaharu Hiraga, and Kiyoshi Terauchi, both of Isesaki, Japan, assignors to Sankyo Electric Company Limited, Isesaki, Japan**

**Filed Aug. 30, 1979, Ser. No. 70,929**
**Claims priority, application Japan, Sep. 9, 1978, 53-110215**
**Int. Cl.³ F01C *1/00*; F04C *18/00***
**U.S. Cl. 418—55** **4 Claims**




1. In a scroll-type fluid compressor unit comprising a cylindrical compressor housing having a front end plate and a rear end plate, a fixed scroll member fixedly disposed within said compressor housing and having first circular end plate means to which first wrap means is affixed, an orbiting scroll member orbitably disposed within said compressor housing and having second circular end plate means to which second wrap means is affixed, said second wrap means being similar to said first wrap means in number of turns, pitch and thickness, driving means for effecting orbital motion of said orbiting member, and said first and second wrap means interfitting with an angular phase difference of 180° to provide a plurality of line contacts to define at least one pair of sealed fluid pockets which move with a reduction of volume thereof by the orbital motion of said orbiting scroll member, to thereby compress the fluid in the pockets, the improvement comprising: said second circular end plate means having substantially a radius of $(2a-R)/2$, where a is a distance from the center of said second wrap means to its outer terminal end and R is the radius of said orbital motion, and the center of said second end plate means being offset from the center of said second wrap means toward the outer terminal end of said second wrap means by R/2, to thereby reduce the radius of said cylindrical compressor housing.

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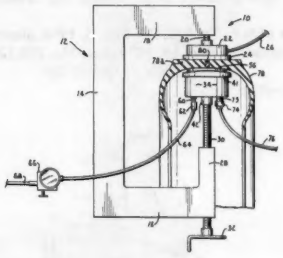
**4,303,380**

## TIRE REPAIR DEVICE

**Norris K. Frankforter, Lincoln, Nebr., assignor to Lincoln Manufacturing Co., Lincoln, Nebr.**

**Filed Mar. 14, 1980, Ser. No. 130,575**
**Int. Cl.³ B60C *25/16***
**U.S. Cl. 425—27** **4 Claims**



1. Tire repair apparatus for use in vulcanizing uncured rubber inserted in a damaged area of a tire casing, said apparatus comprising:

a frame;

a backing member on said frame contoured to substantially conform with the shape of the surface of the tire casing surrounding the damaged area;

a housing on said frame having an open end spaced from said backing member in opposition thereto to permit the damaged portion of the tire casing to be interposed between the backing member and the open end of the housing;

a resilient pressure pad mounted in said housing adjacent the open end thereof for movement inwardly and outwardly in the housing away from and toward the backing member;

an electrically resistive heating element embedded in said pad and adapted to receive electric current for heating of the pad;

means for heating said backing member;

a piston in said housing sealed thereto and abutting said pressure pad to force the latter outwardly upon outward movement of the piston;

a fluid tight pressure chamber in said housing behind said piston; and

means for applying fluid pressure to said pressure chamber to drive said piston outwardly and effect pressing of said pad against the surface of the tire casing adjacent the damaged area, with said heating element and heating means being operable to heat both sides of the tire casing adjacent the damaged area.

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**4,303,381**

## DEVICE FOR SETTING A BASE CUP IN A BLOW MOLD

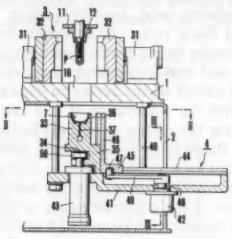
**Katashi Aoki, 6037, Ohaza Minamijo, Sakakimachi, Hanishina-gun, Nagano-ken, Japan**

**Filed May 6, 1980, Ser. No. 147,116**
**Claims priority, application Japan, May 10, 1979, 54-57298**
**Int. Cl.³ B29C *17/07*; B29D *3/00***
**U.S. Cl. 425—503** **5 Claims**

1. A device for setting a base cup in a blow mold comprising a pair of divided molds disposed on a base plate and transversely movable for opening and closing; said device further comprising:

a horizontal stationary plate secured below and fixed with respect to the base plate, a carrier arranged for reciprocal movement on said stationary plate, said stationary plate

extending from a position generally below said divided molds to a position beyond said base plate for permitting movement of said carrier from said position generally below said divided molds to said position beyond said base plate, a bottom mold adapted to hold a base cup, and a lifting device for said bottom mold, said bottom mold



being mounted for vertical movement on said carrier and being arranged for cooperation with said lifting device when said carrier is in said position generally below said divided molds, for lifting said bottom mold into position for cooperation with said divided molds, and being arranged to receive a base cup when in said position beyond said base plate.

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**4,303,382**

**MELT SPINNING NOZZLE TIP**

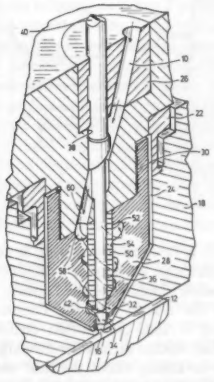
**Jobst U. Gellert, 7A Prince St., Glen Williams, Ontario, Canada**

**Filed May 28, 1980, Ser. No. 153,961**

**Claims priority, application Canada, May 21, 1980, 352349**

**Int. Cl.[3] B29F *1/03***

**U.S. Cl. 425—566** **7 Claims**



1. In a valve-gated injection molding system comprising a gate in a cavity plate leading to a cavity, a molding machine, a hot runner passage extending through a heated heater cast for conveying pressurized plastic melt from the molding machine to the gate, an elongated valve pin to reciprocate in a generally cylindrical bore in the heater cast between open and closed positions, the valve pin having a driven end and a tip end which is received in the gate in the closed position, and valve pin actuating mechanism, the improvement wherein at least a portion of the hot runner passage immediately preceding the gate is divided into a plurality of separate channels which converge again adjacent the gate, each channel being spiral shaped with the valve pin extending centrally therethrough,

whereby a curving motion is imparted to the melt when it enters the cavity through the open gate thereby reducing unidirectional molecular orientation of the melt.

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**4,303,383**

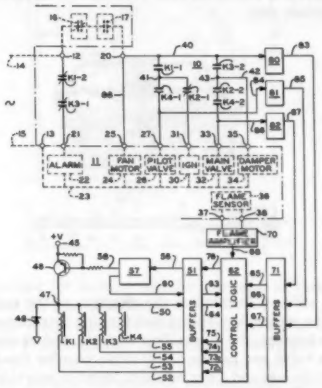
**CONDITION CONTROL SYSTEM WITH SAFETY FEEDBACK MEANS**

**Robert A. Black, Brooklyn Center, and Gary A. Peterson, New Brighton, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Nov. 9, 1979, Ser. No. 92,829**

**Int. Cl.[3] F23N *5/00***

**U.S. Cl. 431—31** **18 Claims**




1. A condition control system having a plurality of output relays adapted to control load means with said load means including at least one critical load and wherein said output relays are monitored to insure the safe operation of said load means, including; control logic means having a plurality of output relays with said control logic means adapted to operate said load means in response to condition responsive means; said output relays each having at least one pair of relay contacts; said output relay contacts connected wherein a pair of contacts from at least two relays electrically are connected in a series energizing circuit to said critical load to insure that electrical failure of one of said pairs of contacts will not preclude the deenergization of said critical load upon said relays being operated by said control logic means to open said series circuit; isolated signal transmission means connected to said relay contacts to supply signals to said control logic means as to the state of said relay contacts; and solid state switch means controlled by said control logic means and connected to all of said relays to operably control power to all of said relays; said solid state switch means responding to said control logic means to remove power from all of said control logic means to remove power from all of said relays when said control logic means discerns a relay contact failure in response to signals from said isolated signal transmission means.

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**4,303,384**

**FLAME FAILURE DEVICE**

**Hugh V. Barnes, London, England, assignor to T.I. Domestic Appliances, Ltd., London, England**

**Filed Jun. 8, 1979, Ser. No. 47,179**

**Claims priority, application United Kingdom, Apr. 25, 1979, 14371/79**

**Int. Cl.[3] F23Q *9/08***

**U.S. Cl. 431—58** **18 Claims**

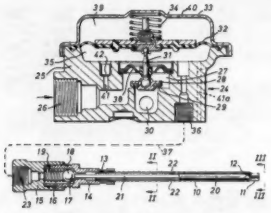
1. A flame-failure device comprising:

a heat-resistant, temperature-sensitive member to be directly heated by a flame and so constructed and arranged that

the member will expand or contract along a generally rectilinear axis as it is heated or cooled;

a mount to which one portion of the temperature-sensitive member is connected and relative to which another portion of the temperature-sensitive member will move as the temperature-sensitive member is heated or cooled;

a main valve for controlling supply of fuel from a fuel supply means to a burner and having a fuel inlet, a fuel outlet, a chamber having a diaphragm defining a wall of the chamber, a main valve member located between the fuel inlet and fuel outlet and operatively connected to the diaphragm and movable therewith, and passage means communicating between the chamber and the fuel inlet whereby a restricted fuel flow can be supplied to the chamber; and,



a pilot valve connected to the chamber of the main valve, having means for venting fuel flowing therethrough from the chamber, for controlling opening and closing of the main valve and having a first valve member fixed relative to the mount and a second valve member movable relative to the fixed valve member and operated by an elongate means arranged adjacent the temperature-sensitive member, the elongate means and movable valve member being arranged to move so as to close the pilot valve when the temperature-sensitive member is heated and to open the pilot valve on cooling of the temperature-sensitive member, the main valve being arranged to open when the pilot valve is closed and to close when the pilot valve is open.

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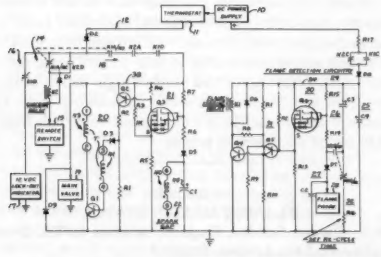
**4,303,385**

## DIRECT IGNITION SYSTEM FOR GAS APPLIANCE WITH DC POWER SOURCE

**George Rudich, Jr., and Russell B. Matthews, both of Goshen, Ind., assignors to Johnson Controls, Inc., Milwaukee, Wis.**

**Filed Jun. 11, 1979, Ser. No. 47,130**
**Int. Cl.³ F23N *5/00***
**U.S. Cl. 431—70** **22 Claims**



1. In an ignition control system for use with an appliance provided with a source of gas, a valve for supplying gas from said source to said appliance, and a thermostat for generating a call-for-heat signal, the combination comprising: flame relay circuit means normally coupled to a source of dc electrical power and operative when enabled to couple said source to said valve; trail-for-ignition timing circuit means normally coupled to said source for enabling said flame relay circuit means for a limited trail-for-ignition period in response to a call-for-heat signal; probe means having a first conductance state in the presence of a flame in said appliance and a second conductance state in the absence of a flame; switching circuit means responsive to said call-for-heat signal for connecting said trial-for-ignition timing circuit means in circuit with said flame relay circuit means and with said probe means and for temporarily isolating said trial-for-ignition timing circuit means and said flame relay circuit means from said power source; and initiation timing circuit means for supplying carry-over power to said trial-for-ignition timing circuit means and said flame relay circuit means during an initation time interval commencing with the occurrence of said call-for-heat signal and for permitting the system to become locked out with said valve and said flame relay circuit means deenergized if said flame relay circuit means fails to operate during said initiation time interval, said probe means normally being in said second conductance state at the commencement of said trial-for-ignition period and operative to permit said trial-for-ignition timing circuit means to time out and thereupon disable said flame relay circuit means if said probe means does not switch to said first conductance state prior to the end of said trial-for-ignition period.

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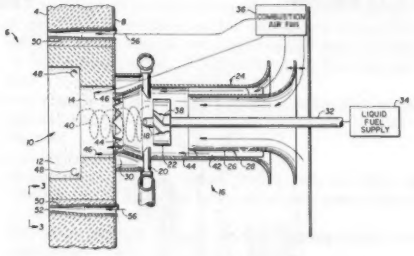
**4,303,386**

## PARALLEL FLOW BURNER

**Temple S. Voorheis, Atherton; Ralph R. Vosper, San Jose; Chester S. Binasik, Palo Alto, and Norman Harthun, San Carlos, all of Calif., assignors to Coen Company, Inc., Burlingame, Calif.**

**Filed May 18, 1979, Ser. No. 40,390**
**Int. Cl.³ F23C *5/08***
**U.S. Cl. 431—177** **28 Claims**



1. A burner for a furnace comprising a centrally located nozzle for the discharge of fuel in a downstream direction towards a combustion chamber of the furnace; a burner throat located between the nozzle and the combustion chamber; means for forming a first, combustion airflow substantially co-axially about the nozzle; means for flowing a second combustion airstream co-axially about the first airstream past the nozzle and towards the chamber; means for forming a third airstream formed generally coaxially about and enveloping the second airstream at a point downstream of the nozzle; and means forming said second and third airstreams including a tubular conduit mounted within the burner at a location downstream of the nozzle, the tubular conduit opening toward the burner throat and having an outer diameter less than the diameter of the burner throat; whereby the third airstream limits the diameter of a flame produced by the nozzle and thereby prevents substantial contact between the flame and a burner throat defined by the furnace; said means for forming the third airflow including means for directing the third airflow along an outside of the tubular conduit towards the burner throat; the end of said tubular conduit proximate the burner throat defining an edge having at least one segment obliquely inclined

relative to the axis of said tubular conduit; and means disposed upstream of the nozzel for imparting to the first airstream only a swirl motion.

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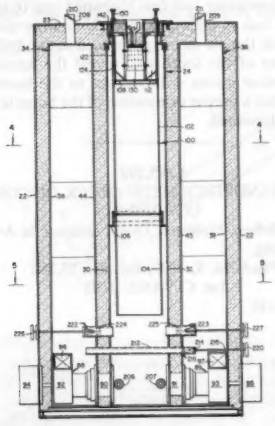
4,303,387

## ENAMELED WIRE OVEN

Richard E. Burke, Hixson, Tenn., and Edward H. Harris, Kissimmee, Fla., assignors to Hudson Wire Company, Trenton, Ga.

Filed Dec. 9, 1980, Ser. No. 214,587
Int. Cl.³ F27B 9/28
U.S. Cl. 432—72 14 Claims



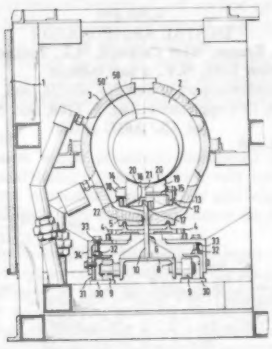
1. An oven for drying and curing coated wire and the like comprising, an outer housing including a plurality of structural members fastened together into a substantially rectangular frame and having exterior surface means fastened to the outer portions of said members, a pair of vertically elongated air chambers disposed within said outer housing spaced from each other, each air chamber including an upstanding wall means, a vertically elongated burner tube housing disposed within a medial portion of said outer housing intermediate said air chambers, a partition disposed across said burner tube housing for dividing said burner tube housing into upper and lower zones, a vertically elongated burner tube disposed within and spaced from said burner tube housing, said burner tube extending through said partition in substantially sealed disposition therewith for communicating the upper zone with the lower zone, said burner tube including a plurality of inlet openings at the upper end and an outlet opening at the lower end, a burner having inlet openings and flame generating means disposed within said burner tube adjacent the upper end, each of said air chambers having separate blower means including an inlet communicating with the lower zone of said burner tube housing and an outlet communicating with the respective air chamber for circulating hot air from the lower zone of said burner tube housing into the air chambers, a door means removably secured to said outer housing in spaced relation with each of said wall means for defining a pair of work chambers therebetween for receiving wire fed vertically upwardly from a wire inlet through each work chamber to a wire outlet upper and lower supply conduit means within each of said air chambers communicating the interior of each air chamber with a respective upper and lower portion of one of said work chambers, and a return conduit intermediate each pair of upper and lower supply conduits communicating each work chamber with said upper zone of said tube housing.

4,303,388

## PREHEATING FURNACE

Friedrich W. Elhaus, Jägerhofstr. 117a, D-5600 Wuppertal 1, Fed. Rep. of Germany

Filed Oct. 18, 1979, Ser. No. 86,206
Claims priority, application Fed. Rep. of Germany, Jul. 19, 1979, 2929322
Int. Cl.³ F27D 3/00
U.S. Cl. 432—246 12 Claims



1. A furnace for heating metallic material in bars, billets, blooms, and the like, comprising:

a furnace tunnel through which material to be heated is guided longitudinally, including an elongated opening along the lower section of said furnace tunnel;

means for guiding the material longitudinally through said furnace tunnel, said guiding means including at least two rollers on which the material is advanced, said rollers being positioned within said furnace tunnel along the longitudinal axis of the material to be heated, and each of said rollers having two running surface portions tapering towards each other and towards the center of the roller, said center having a cylindrical section of smaller diameter than the running surface portions; and

means for supporting said guiding means, extending through said elongated opening, said supporting means being slidably mounted outside said furnace tunnel adjacent said guiding means for movement of said guiding means into and out of said furnace tunnel.

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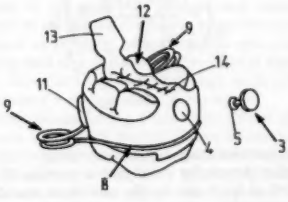
4,303,389

## INSTRUMENT FOR THE CLINICAL APPLICATION OF FILLINGS FOR DENTAL CAVITIES

Angelo Salsarulo, 45, rue Jean Mermoz, F-78620 Etang-la-Ville, France

Filed Jun. 12, 1980, Ser. No. 158,911
Claims priority, application France, Jun. 12, 1979, 79 14929
Int. Cl.³ A61C 9/00
U.S. Cl. 433—40 6 Claims




1. An instrument for the clinical application of fillings for dental cavities, comprising a matrix retainer and a matrix hav-

ing a cutout that is entirely surrounded by the material of the matrix, a detachable element disposed in said cutout formed in the matrix and being adapted to remain incorporated in filling material for said dental cavity after setting of the filling material by means of an internal anchoring member embedded in said material, and means detachably securing the detachable element to the rest of the matrix while filling of the dental cavity is in progress.

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**4,303,390**

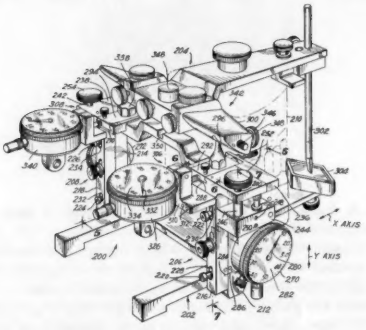
## DENTAL ARTICULATOR

**Bernard M. Kruger, West Caldwell, N.J., assignor to Norbert Richter, New York, N.Y., a part interest**

**Continuation-in-part of Ser. No. 45,621, Jun. 5, 1979, abandoned. This application Aug. 5, 1980, Ser. No. 175,490**

**Int. Cl.³ A61C *11/00***

**U.S. Cl. 433—59** **21 Claims**




1. A dental articulator comprising a base frame, an upper frame, a pair of adjustable condyle means, mounted on said base frame and supporting said upper frame for pivotal motion of said upper frame relative to said base frame, with each of said adjustable condyle means comprising a condyle post, condyle post supporting means for independent horizontal adjustment of said condyle post relative to said base frame, and vertical adjustment means for vertical adjustment of said condyle post relative to said base frame.

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**4,303,391**

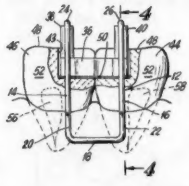
## DENTAL BORE-LOCATING GUIDE

**Bernard Weissman, New York, N.Y., assignor to IPCO Corporation, White Plains, N.Y.**

**Continuation-in-part of Ser. No. 70,247, Aug. 27, 1979, Pat. No. 4,260,383. This application Feb. 15, 1980, Ser. No. 121,834**

**Int. Cl.³ A61C *3/02***

**U.S. Cl. 433—76** **11 Claims**



1. A dental bore-locating guide comprising:

front member means for overlying a portion of the labial surface of at least one tooth, said front member means being detectable under x-rays, said front member means including a pair of parallel legs connected by a bight to define a U-shaped section;

top member means laterally extending from said front member means for overlying a portion of the occlusal surface of the tooth, said top member means including a pair of parallel arms perpendicularly extending from respective ends of said legs;

pin means extending downwardly from said top member means and lying in a spaced plane from said front member means for being received in a tubular drill guide upwardly extending from the occlusal surface of the tooth, said pin means including a pair of parallel pins perpendicularly extending from respective ends of said arms;

associated, connected ones of said legs, arms and pins defining a first U-shaped unit;

the other associated, connected leg arm and pin defining a second U-shaped unit;

said bight connecting said first U-shaped unit to said second U-shaped unit to define a double U-configuration;

whereby with the pin means positioned in the drill guide, an x-ray taken of the tooth will reveal the location of the front member means with respect to the interior of the tooth so that a proper orientation of the bores to be drilled can be determined.

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**4,303,392**

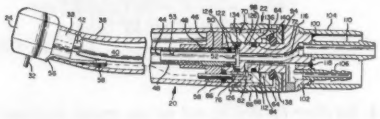
## DENTAL HANDPIECE WITH QUICK DISCONNECT COUPLING

**Russell L. Rollofson, Hubbard, Oreg., assignor to A-Dec, Inc., Newberg, Oreg.**

**Filed Jul. 9, 1979, Ser. No. 55,382**

**Int. Cl.³ A61C *1/08***

**U.S. Cl. 433—126** **6 Claims**



1. A dental handpiece comprising:

a handle,

a plurality of tubes extending within the handle from its rearward end to its forward end,

coupling means at the rearward end of the handle for connecting the handle to a plurality of fluid supply hoses so that each hose can deliver fluid to a corresponding one of the tubes while permitting the handle to be rotated relative to the hoses,

the coupling means including a seal bushing at the rearward end of the handle, the seal bushing having an inner wall defining a cylindrical bore and a plurality of passages extending rearwardly from the forward end of the seal bushing and opening in axially spaced recesses in the inner wall, the passages receiving corresponding ones of the tubes in their forward ends,

a connector having a cylindrical neck at its forward end slidably inserted in the bore and means at its rearward end for attaching the fluid supply hoses,

the connector having a plurality of passages each corresponding to a passage through the seal bushing, the connector passages extending from the hose attaching means to axially spaced recesses in an outer wall of the neck, each connector recess being contiguous with a seal bushing recess to define mating pairs, at least one recess of each pair being annular so that fluid can flow continuously through the corresponding passages when the seal bushing is rotated relative to the connector,

said handle including an externally threaded cylindrical portion at its rearward end,

said coupling means including an internally threaded cylindrical nut screwed over the externally threaded handle portion and having a radially inwardly extending flange overlapping the rearward end of the seal bushing,

said neck having an annular locking groove positioned adjacent the rearward end of the seal bushing,
and an elastomeric locking O-ring positioned between the rearward end of the seal bushing and the flange and seated in the locking groove, the nut capable of being screwed a predetermined amount toward the handle to confine the O-ring and prevent sufficient deformation thereof out of the groove to permit the neck to be withdrawn from the bore.

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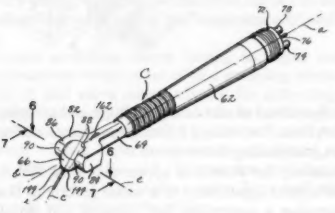
**4,303,393**

## DENTAL HANDPIECE

**Don C. Gentry, 1810 SW. Blvd., Jefferson City, Mo. 65101**

**Continuation-in-part of Ser. No. 874,381, Feb. 2, 1978, abandoned. This application Oct. 22, 1979, Ser. No. 87,414**
**Int. Cl.³ A61C *1/12***
**U.S. Cl. 433—130** **14 Claims**



1. A dental handpiece comprising: a handle having forward and rear ends, a shank projection from the forward end of the handle, the shank being bifurcated so as to have two spaced apart arms; a turbine head between the arms of the bifurcated shank; a turbine-type dental engine in the turbine head for rotating a dental bur about an axis, the turbine head being attached to the arms of the shank such that the position of the engine axis can be varied with respect to the handle; and means extended through the handle and through both arms of the shank for supplying high pressure air to the turbine engine to rotate the dental bur.

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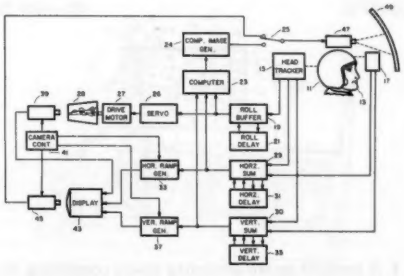
**4,303,394**

## COMPUTER GENERATED IMAGE SIMULATOR

**Herbert Berke, Maitland; John H. Allen, Winter Park, and Joseph R. Owen, Orlando, all of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jul. 10, 1980, Ser. No. 167,276**
**Int. Cl.³ G09B *9/08***
**U.S. Cl. 434—40** **14 Claims**




1. A computer generated image simulator comprising, in combination:
a helmet adapted to be worn upon the head of a trainee pilot;
head tracking means connected to said helmet for continuously monitoring the horizontal, vertical, and rotational movement of the head of said trainee pilot, and for providing at the output thereof horizontal, vertical, and rotational head orientation signals indicative of such movement, said head tracking means having first, second, and third outputs;
eye tracking means connected to said helmet in such a manner so as to be in alignment with the line of sight of said trainee pilot for continuously monitoring the horizontal and vertical movement of the eyes of said trainee pilot, and for providing at the output thereof horizontal and vertical eye orientation signals indicative of such movement, said eye tracking means having first and second outputs;
timing circuit means having an input connected to the first output of said head tracking means for delaying said rotational head orientation signal for a first predetermined time interval;
a visual target;
servomechanism means effectively connected between the output of said timing circuit means and said visual target for effecting the rotational movement of said visual target in accordance with said delayed rotational head orientation signal;
first summing circuit means having a first input connected to the second output of said head tracking means, a second input connected to the first output of said eye tracking means and an output for delaying said horizontal head and eye orientation signals for a second predetermined time interval and for combining said delayed horizontal head and eye orientation signals so as to form a horizontal movement indicator signal;
second summing circuit means having a first input connected to the third output of said head tracking means, a second input connected to the second output of said eye tracking means and an output for delaying said vertical head and eye orientation signals for a third predetermined time interval, and for combining said delayed vertical head and eye orientation signals so as to form a vertical movement indicator signal;
first camera means positioned in front of said visual target and having an input and an output for continuously scanning said visual target and the rotational movement associated therewith, and for providing a first video signal in response to the scanning of said visual target thereby;
control means having a first control output connected to the input of said first camera means, a second control output, a first sync output, and a second sync output for generating a first control signal so as to effect the scanning of said visual target by said first camera means, a second control signal, a first sync signal, and a second sync signal;
horizontal ramp generating means having a sync input connected to the first sync output of said control means, a data input connected to the output of said first summing circuit means, and an output for producing a first sawtooth waveform signal in response to said first sync signal, and for combining said first sawtooth waveform signal with said horizontal movement indicator signal so as to provide at the output thereof a first raster drive signal;
vertical ramp generating means having a sync input connected to the second sync output of said control means, a data input connected to the output of said second summing circuit means and an output for producing a second sawtooth waveform signal in response to said second sync signal and for combining said second sawtooth waveform signal with said vertical movement indicator signal so as to provide at the output thereof a second raster drive signal;
image display means having a television screen therein, and a trio of data inputs with the trio of data inputs thereof respectively connected to the output of said first camera means, the output of said horizontal ramp generating means, and the output of said vertical ramp generating means for reproducing upon said television screen said visual target and the rotational movement associated therewith in response to said first video signal, and for varying the position of said visual target upon said television screen in accordance with

the movement of the head and eyes of said trainee pilot in response to said first and second raster drive signals;

second camera means positioned in front of the television screen of said image display means and having an input connected to the output of said control means, and an output for scanning the visual target reproduced upon the television screen of said image display means, and for providing a second video signal in response to the scanning of said visual target thereby;

a reflective display screen substantially encompassing the field of view of said trainee pilot; and

means mounted upon said helmet and having an input effectively connected to the output of said second camera means for projecting upon said reflective display screen said visual target in response to said second video signal.

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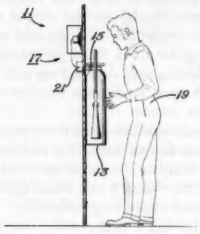
**4,303,395**

## EMERGENCY AUDIBLE INSTRUCTION APPARATUS FOR A FIRE EXTINGUISHER

**James C. Bower, Box 244 E. Rte. 9, Fort Worth, Tex. 76101**

**Filed Jun. 11, 1979, Ser. No. 47,037**
**Int. Cl.³ G11B *31/00***
**U.S. Cl. 434—226** **4 Claims**



**1.** An improved safety combination adapted to facilitate fighting a fire by an operator, comprising:

a. a fire extinguisher at a fire extinguisher station;

b. support supporting said fire extinguisher at said fire extinguisher station such that said fire extinguisher can be removed from said support by the operator;

c. a speaker adapted to emit audible verbal signals that are perceptible by the operator operating said fire extinguisher; said speaker being disposed at said first station;

d. recorded instructions recorded in a first form and transduceable into audible verbal signals by an instruction play means and said speakers;

e. instruction play means for transducing said instructions from said first form into a form that, in combination with said speaker will convert said first form into audible verbal signals for said operator; said instruction play means being connected with said recorded instructions and with said speaker; and

f. switch means for energizing said instruction play means when said fire extinguisher is lifted from said support; said switch means being connected with said instruction play means and responsive to said fire extinguisher on said support;

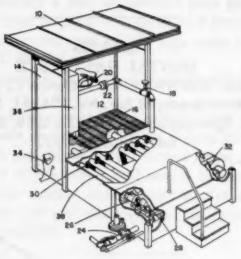
such that audible verbal signals are supplied to the operator operating said fire extinguisher to give instructions and simultaneously allow full free use of the operators hands for fighting a fire.

**4,303,396**

## FIRE FIGHTING TRAINING DEVICE AND METHOD

**Edmund Swiatosz, Maitland, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Oct. 22, 1979, Ser. No. 86,977**
**Int. Cl.³ G09B *9/00***
**U.S. Cl. 434—226** **11 Claims**



**11.** A method of simulating oil bilge and oil spray fires, and Class A fires, for training a firefighter trainee during a training session, comprising the steps of:

simulating the structural appearance of a fuel line and the structural appearance of a metal grating as flooring;

generating a controlled fire through said simulated metal grating floor;

reducing said controlled fire by automatic response to fire retardant material directed by said trainee properly, as determined by preselected parameters, to extinguish said simulated fire;

ending said training session when said trainee has satisfactorily completed preselected procedures subsequently to properly extinguishing said simulated fire;

restoring said controlled fire by automatically discontinuing said reduction when said trainee fails to satisfactorily complete said preselected procedures subsequent to properly extinguishing said simulated fire.

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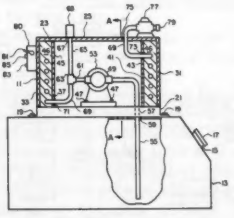
**4,303,397**

## SMOKE GENERATING APPARATUS

**Edmund Swiatosz, Maitland, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 8, 1980, Ser. No. 176,426**
**Int. Cl.³ B01J *13/00***
**U.S. Cl. 434—226** **15 Claims**



**1.** A nontoxic smoke generating device comprising, in combination:

a storage tank having an aperture extending through the top thereof and a smoke producing agent stored therein;

a base support member mounted upon the top surface of said storage tank, said base support member having extended

therethrough an aperture in alignment with the aperture of said storage tank;

a housing fixedly attached to said base support member, and having a top wall;

coil means mounted within said housing, and having first and second terminals for superheating said smoke producing agent to a predetermined temperature;

pumping means mounted upon said base support member, said pumping means having an inlet passing through the aligned apertures of said base support member, and said storage tank, an outlet connected to one end of said coil means, an input, and an output for withdrawing said smoke producing agent from said storage tank so as to supply said smoke producing agent to said coil means;

valve means mounted on the top wall of said housing, said valve means having an inlet connected to the other end of said coil means, an outlet, an input, and an output for releasing said superheated smoke producing agent into the atmosphere as a vapor;

probe means affixed to said coil means and having an output for continuously monitoring the temperature of said coil means;

normally open switching means having an input, and an output connected to the input of said pumping means and the input of said valve means adapted for activating said valve means, and said coil means whenever an operator closes said normally open switching means so as to effect the release of said superheated smoke producing agent into the atmosphere by said valve means, and the withdrawal of said smoke producing agent from said storage tank by said pumping means; and

control circuit means having a first terminal connected to the first terminal of said coil means, a second terminal connected to the second terminal of said coil means, a third terminal connected to the input of said normally open switching means, a fourth terminal connected to the output of said pumping means and the output of said valve means, and a fifth terminal connected to the output of said probe means for providing an alternating current signal so as to effect the superheating of said smoke producing agent to the predetermined temperature by said coil means, and for inhibiting the activation of said coil means, and said pumping means by said normally open switching means whenever the temperature of said coil means is less than the predetermined temperature required to superheat said smoke producing agent.

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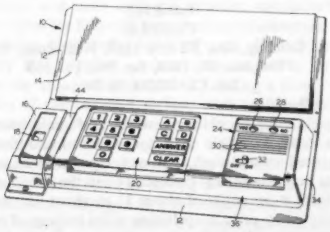
**4,303,398**

## ELECTRONIC QUIZ GAME UTILIZING CARTRIDGES AND METHOD EMPLOYING SAME

**Mark L. Yoseloff, Simsbury, Conn., assignor to Coleco Industries, Inc., Hartford, Conn.**

**Filed Jun. 28, 1978, Ser. No. 919,930**
**Int. Cl.³ G09B 7/00**
**U.S. Cl. 434—335** **18 Claims**




**1.** In an apparatus for playing a question-and-answer game, the combination comprising:

a. a storage-and-comparison circuit including storage-and-comparison-circuit terminals, numerical values being enterable by connection of pairs of said storage-and-comparison-circuit terminals, and said circuit being operable by connection of pairs of said storage-and-comparison-circuit terminals to perform a multivariate logical operation on entered numerical values to enter a resultant numerical value and to compare the resultant numerical value with an entered numerical value, at least one comparison-result terminal being provided for carrying signals indicative of the result of said comparison;

b. a keyboard having keyboard terminals and a multiplicity of keys each labeled with a distinction indicium, associated with a pair of keyboard terminals, and operable to connect them;

c. a removable question-and-answer unit including a base having connector means thereon and listing means attached thereto, said connector means being removably electrically connected simultaneously to some of said storage-and-comparison-circuit terminals and some of said keyboard terminals and providing connection circuitry electrically connecting some of said storage-and-comparison-circuit terminals to some of said keyboard terminals for connection of some of said storage-and-comparison-circuit terminal pairs upon operation of some of said keys, said connection circuitry being arranged for entry of numerical values and performance by said storage-and-comparison circuit of said logical operation upon operation of some of said key and comparison of the resultant numerical value with an entered numerical value upon operation of at least one of said keys when said removable connector means is simultaneously connected to said keyboard terminals and said storage-and-comparison-circuit terminals, whereby the resultant numerical value entered by operation of said keys can be changed by substituting a connector means in which the connection circuitry is arranged differently between said storage-and-comparison-circuit terminals and said keyboard terminals, said listing means providing a listing of questions and associated sets of answers, some of said questions being associated with a question code consisting of at least two of said keyboard indicia, one answer of each set being predetermined the correct answer, each answer being associated with an answer code consisting of at least one of said keyboard indicia, said connector means thereby establishing a correspondence between question codes and answer codes, the resultant numerical value entered by operation of the keys labeled with the indicia of which a question code consists being equal, when said connector means is connected to said storage-and-comparison-circuit and keyboard terminals, to the numerical value entered by operation of the key labeled with the indicia of which the associated correct-answer code consists, said listing means thereby uniquely matching the correspondence established by said connector means; and

d. indicator means connected to said comparison-result terminal of said storage-and-comparison circuit, said indicator means producing a humanly detectable translation of said signals present on said comparison-result terminal.

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**4,303,399**

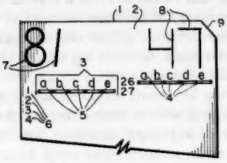
## TEST SCORING CARD AND METHOD OF EMPLOYING SAME

**Thaddeus L. Scott, 360 Hyde Dr., Hayward, Calif. 94544**

**Filed Mar. 31, 1980, Ser. No. 135,537**
**Int. Cl.³ G09B 7/06**
**U.S. Cl. 434—358** **5 Claims**

**1.** A test scoring card system, comprising a flat card having an upper side and a lower side, said card being formed of a material which transmits light between said sides, an opaque layer secured to said lower side, a plurality of openings in said opaque layer disposed in a preselected patterned distribution, a plurality of sets of answer mark indicating areas disposed on said upper side, wherein one mark indicative area of each set is representative of a correct answer and is positioned in registra-

tion with a respective one of said openings to pass light through said respective opening, said card, and said one mark



indicative area, and scoring means for sensing light passing through said card.

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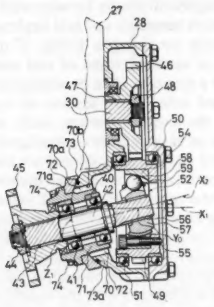
4,303,400

## MARINE PROPULSION DEVICE

Kazuhiko Yano, Toyonaka, and Kazuhiko Ohtsuki, Takarazuka, both of Japan, assignors to Kanzaki Kokyukoki Mfg. Co., Ltd., Amagasaki, Japan

Filed Sep. 27, 1979, Ser. No. 79,445
Claims priority, application Japan, Oct. 7, 1978, 53-123858
Int. Cl.[3] B63H *23/06*
U.S. Cl. 440—75 3 Claims



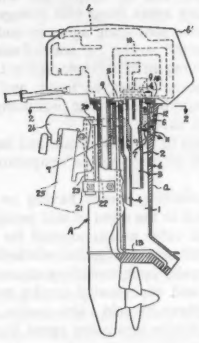
1. A marine propulsion unit comprising an engine, a propeller shaft carrying a propeller, a clutch mechanism for transmitting power from the engine to the propeller shaft, and gearing connecting an output shaft of the clutch mechanism to a transmission shaft which is aligned coaxially with and fixedly coupled to the propeller shaft, the transmission shaft and clutch output shaft being non-parallel and the gearing comprising first and second meshed spur gears which are mounted on the clutch output shaft and the transmission shaft respectively within a transmission casing for the gearing, the first spur gear being fixedly secured to the clutch output shaft and the second spur gear being connected operatively to the transmission shaft by means of a constant velocity universal joint which is disposed within the second spur gear, and the transmission casing being provided at the output end portion thereof with a separate casing part which is fixed to the remainder of the transmission casing, the transmission shaft being rotatably supported by the separate casing part through bearing means so that the angle of inclination of the transmission shaft is determined by the inclination of said separate casing part relative to the remainder of the transmission casing.

4,303,401

## SUSPENSION MEANS FOR OUTBOARD ENGINES

Yasumaru Sanmi; Norimichi Harada, and Yasuhiro Nishida, all of Hamamatsu, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Continuation of Ser. No. 31,972, Apr. 20, 1979, abandoned, which is a continuation of Ser. No. 841,526, Oct. 12, 1977, abandoned. This application Feb. 22, 1980, Ser. No. 123,576
Claims priority, application Japan, Oct. 13, 1976, 51-138056
Int. Cl.[3] B63H *5/12*
U.S. Cl. 440—88 9 Claims



1. Suspension means for outboard motors which include a motor, a casing housing said motor, said casing having a substantial vertical dimension, and requirement for support at an upper portion thereof, said suspension means comprising:

upper and lower brackets for mounting said outboard motor to a boat;

support members including rubber bushings, said upper bracket and said upper portion of said casing being connected to each other by said support members;

cooling water supply means;

a cooling water storing chamber receiving cooling water from said cooling water supply means and having a bottom just beneath the level of the upper bracket and well above the level of the lower bracket, said support members being disposed inside of said water storing chamber and being partially or totally submerged in water therein, whereby to be cooled by said water, said water storing chamber having a wall with a small hole therethrough at an elevation which is above said bottom and also beneath the level of water therein for discharging cooling water from said water storing chamber to the atmosphere, whereby to maintain a flow of cooling water through said chamber.

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4,303,402

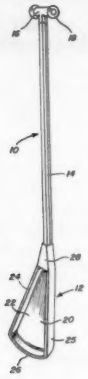
## PADDLE

Thomas L. Gooding, Rte. #2 Box 1184, Wild Rose, Wis. 54984

Filed Jan. 17, 1980, Ser. No. 114,105
Int. Cl.[3] B63H *16/04*
U.S. Cl. 440—101 4 Claims

1. A paddle for propelling a water craft, said paddle comprising a blade, a straight shaft connected to said blade, and a handle placed on said shaft at an end opposite from said blade, said blade being angularly displaced from the longitudinal axis of said shaft at an angle of about 7° to about 15°, said blade comprising a cup portion including a flat bottom of triangular web-shape, two side walls substantially perpendicular to said bottom and a front lip portion connecting said side walls, said front lip portion being sloped away from said bottom, said paddle including a reinforcement portion contiguous with said cup portion and positioned between said cup portion and said shaft, said reinforcement portion being in a plane parallel to

said shaft, said cup portion of said blade being angularly displaced from said shaft, said shaft being hollow and formed of




lightweight materials selected from the group consisting of foam injected plastics and lightweight metal and said blade being formed from foam injected plastic.

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**4,303,403**

## COMPOSITE DRIVING BELT

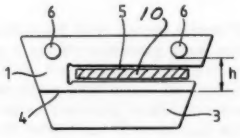
**Hendricus F. Lamers, Goirle, Netherlands, assignor to Van Doorne's Transmissie B.V., Tilburg, Netherlands**

**Filed Jan. 18, 1980, Ser. No. 113,194**

**Claims priority, application Netherlands, Jan. 19, 1979, 7900435**

**Int. Cl.³ F16G** *1/00, 5/00*

**U.S. Cl. 474—201** **2 Claims**




1. A driving belt of substantially trapezium-shaped cross section for use with V-shaped pulleys, of the kind including an endless carrier and a plurality of plate-like elements disposed transverse to and slidably mounted on the carrier, each of said elements having an inner tapered end for engaging a V-shaped pulley groove, and outer end and opposite substantially flat faces which abut the faces of the two adjacent elements, one of the faces at the inner end portion of each element having a substantially flat bevelled surface extending in a direction away from the adjacent element and forming a tilting line at the junction of the bevelled surface with said one face, the tilting line enabling each element to tilt about its respective tilting line toward and away from said adjacent element whereby said belt can bend during use, one face of the outer end portion of each element having at least one projection which is releasably engaged in a corresponding recess in the face of the abutting element when the respective belt portion is straight, the improvement wherein said projections and recesses lie at a distance from the tilting line in a direction toward the outer ends of said elements such that during bending of the belt and consequent tilting of said elements said projections and recesses come out of engagement.

**4,303,404**

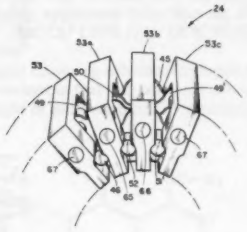
## INFINITELY VARIABLE RATIO TRANSMISSION APPARATUS

**George E. Moore, 7440 N. Park Ave., Indianapolis, Ind. 46240**

**Filed Aug. 27, 1979, Ser. No. 69,787**

**Int. Cl.³ F16G** *1/24, 5/18*

**U.S. Cl. 474—242** **16 Claims**




9. A variable ratio transmission apparatus comprising:

an input shaft;

a driving pulley arrangement disposed on said input shaft;

an output shaft;

a driven pulley arrangement disposed on said output shaft; and

a continuous chain coupling said driving pulley arrangement with said driven pulley arrangement, said chain including:

(a) a repeating pattern of three pairs of overlapping, staggered and interconnected link plates;

(b) a first plurality of connecting pins arranged into an outer first row;

(c) a second plurality of connecting pins arranged into an inner second row;

(d) a plurality of U-shaped drive members attached to said link plates by said first plurality of connecting pins; and

(e) said link plates being interconnected to each other solely by said second plurality of connecting pins and said three pairs of overlapping, staggered and interconnected link plates being arranged into a first pair of outside link plates, a second pair of intermediate link plates and a third pair of inside link plates.

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**4,303,405**

## APPARATUS FOR FORMING AND INSERTING PARTITIONS INTO CONTAINERS

**Donald G. Reichert, Tarpon Springs, Fla., assignor to ABC Packaging Machine Corporation, Tarpon Springs, Fla.**

**Filed Mar. 19, 1979, Ser. No. 21,349**

**Int. Cl.³ B31B** *11/02*

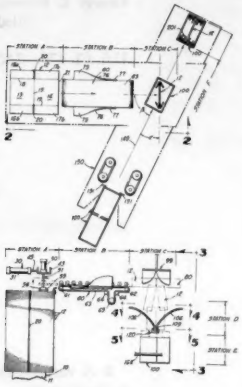
**U.S. Cl. 493—92** **21 Claims**

1. Apparatus for inserting partitions, each having a central partition member, into open containers, each container of which has opposed spaced parallel end walls and opposed spaced parallel side walls forming a rectangular perimeter:

(a) means for conveying said containers successively along a prescribed path through a partition inserting station;

(b) means for moving said partitions respectively into said containers in said station with the partition member of each partition disposed at a sufficient angle with respect to the sides of its container that it is loosely received in its container; and occupies less space lengthwise from end wall to end wall in its container than the partition does when it is parallel to the side walls of its container.

(c) twist means for twisting each of said partitions, after insertion into said container, for rotating said partition

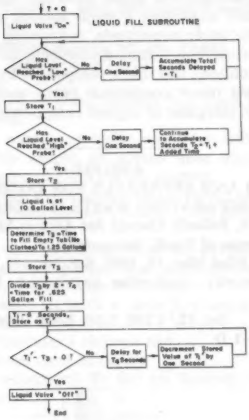


member from its loose angled position about parallel to the side walls of its container.

## 4,303,406
## AUTOMATIC LIQUID LEVEL CONTROL

Frank E. Ross, Newton, Iowa, assignor to The Maytag Company, Newton, Iowa

Filed Mar. 14, 1980, Ser. No. 130,470
Int. Cl.[3] D06F *33/02, 39/08*
U.S. Cl. 8—158 11 Claims


T = 0
Liquid Valve "On"
LIQUID FILL SUBROUTINE
Has Liquid Level Reached "Low" Probe?
No
Delay One Second
Accumulate Total Seconds Delayed = T1
Yes
Store T1
Has Liquid Level Reached "High" Probe?
No
Delay One Second
Continue to Accumulate Seconds T2 = T1 + Added Time
Yes
Store T2
Liquid is at 10 Gallon Level
Determine T3 =Time to Fill Empty Tub (No Clothes) To 1.25 Gallons
Store T3
Divide T3 by 2 = T4 =Time for .625 Gallon Fill
T5 = 0 Seconds, Store as T5
T5 - T2 = 0 ?
No
Delay for T4 Seconds
Decrement Stored Value of T5 by One Second
Yes
Liquid Valve "Off"
End

1. An automatic liquid level control system for a laundry apparatus having a tub for containing liquid and a perforate basket within said tub for containing fabrics to be treated, the combination comprising: inlet means for supplying liquid to said tub and operable for spraying liquid into said apparatus for absorption by said fabrics and flow through said fabrics for accumulation in said tub; means for measuring the rate of change of liquid level in said tub in the presence of fabrics as a gauge of the total liquid required to treat the specific fabric load in said basket; and programmable control means including logic circuit means responsive to said measuring means for determining the additional liquid required to provide said total liquid and for controlling said inlet means to provide an additional timed fill to achieve said total liquid.

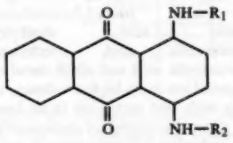
11. A method of automatically determining and providing a liquid level in a laundry apparatus having a tub for containing liquid and a perforate basket in said tub for containing fabrics to be treated, comprising the steps: injecting liquid into said tub by spraying the liquid onto the fabrics for absorption by said fabrics and flow therethrough for accumulation in said tub; sensing the time to fill said tub to a first predetermined liquid level as a measure of the fabric load characteristics; sensing the time to fill said tub to a second higher predetermined liquid level and determining therefrom the time to fill said tub to said first predetermined level without fabrics; determining the additional quantity of liquid required commensurate with the sensed fabric load characteristics and based upon a comparison of the actual time to fill to said first predetermined level and the time to fill to that level without fabrics; and injecting said additional quantity of liquid into said tub.

## 4,303,407
## CONCENTRATED COLORING SOLUTIONS OF A BLUE TINGE BASED ON MIXTURE OF 1.4-DIALKYL-ANTHRAQUINONES FOR THE COLORING OF PETROLIFEROUS PRODUCTS

Ugo Marangelli; Giancarlo Ciocci, both of Saronno, and Sisto S. Papa, Milan, all of Italy, assignors to Aziende Colori Nazionali Affini ACNA S.p.A., Milan, Italy

Filed May 21, 1980, Ser. No. 152,087
Claims priority, application Italy, May 23, 1979, 22909 A/79
Int. Cl.[3] C09B *1/16;* C07C *97/12*
U.S. Cl. 8—643 5 Claims

1. Blue tinged colouring solutions for liquid petroleum distillates, characterized in that said solutions contain from 50% to 60% by weight of anthraquinonic compounds of the general formula:




(II)

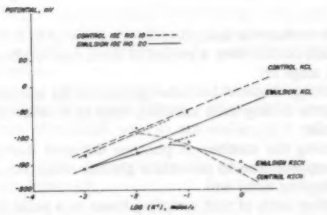
wherein $R_1$ and $R_2$, equal to or different from each other, represent linear or branched alkyl radicals having from 4 to 8 carbon atoms, in an organic diluting phase, said solutions being obtained by reacting leuco-quinizarine, alone or in admixture with quinizarine, with mixtures containing from 3 to 4 aliphatic amines having the hereunder indicated structure and molar ratios:

aliphatic amines with 7 and/or 8 carbon atoms:0.35–0.50 mols;
aliphatic amines with 6 carbon atoms:0–0.40 mols
aliphatic amines with 5 carbon atoms:0.40–0 mols
aliphatic amines with 4 carbon atoms:0.25–0.1 mols

## 4,303,408
## REMOVAL OF INTERFERENTS IN ANALYTICAL ASSAYS IN A TWO PHASE INTERFERENT-REMOVAL ZONE

Sang H. Kim, Pittsford, and Richard W. Spayd, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 5, 1980, Ser. No. 118,706
Int. Cl.[3] G01N *31/00;* C01G *37/00, 37/08*
U.S. Cl. 23—230 B 53 Claims




1. In an element for analysis of a liquid containing an analyte wherein an interferent is removed from the assay of the analyte, said element comprising at least two zones wherein at least one zone comprises an interferent-removal zone, and at least one additional zone comprises an assay indicator zone, the improvement wherein the zone for interferent-removal comprises a discontinuous liquid phase within a continuous phase wherein the discontinuous liquid phase comprises a material for extracting an interferent to the assay of said analyte and the continuous phase is permeable to said liquid under analysis, the

analyte or an interaction product, said interferent-removal zone being located between the assay indicator zone and the point of introduction of the liquid.

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**4,303,409**

## METHOD, COMPOSITION AND TEST STRIP FOR COLORIMETRIC ANALYSIS OF ASCORBIC ACID

**Yasunao Ogawa, Ikeda, and Kaoru Ishitobi, Yao, both of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan**

**Filed Apr. 15, 1980, Ser. No. 140,675**

**Claims priority, application Japan, Apr. 24, 1979, 54-51278**

**Int. Cl.³ G01N *33/52, 33/82***

**U.S. Cl. 23—230 B** **12 Claims**

1. A composition for colorimetric analysis of ascorbic acid by the formation of colored complexes of a polyvalent metal ion in its lower valency which comprises: a complex of a chelating agent selected from the group consisting of ethylenediaminetetraacetic acid, trans-1,2-cyclohexanediamine-N,N,N′,N′-tetraacetic acid, diethylenetriamine-N,N,N′,N″,N″″-pentaacetic acid, triethylenetetramine-N,N,N′,N″,N‴,N″″-hexaacetic acid and alkali metal salts thereof with a polyvalent metal ion in its higher valency; an indicator capable of reacting with said metal ion in its lower valency selected from the group consisting of o-phenanthroline, 4,7-diphenyl-1,10-phenanthroline 2,2′-bipyridine, cuproine, neocuproin and 2,2′,2″-terpyridine; and a buffer capable of maintaining the pH value of the composition to from 3 to 6.5.

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**4,303,410**

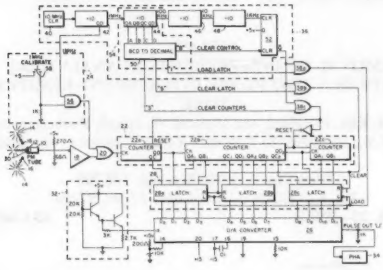
## LIGHT BURST ACTIVITY ANALYZER

**Hugh D. Copeland, Chula Vista, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 3, 1980, Ser. No. 203,003**

**Int. Cl.³ G01N *33/18, 21/76***

**U.S. Cl. 23—230 R** **14 Claims**




13. A method for analyzing the structure of light burst activity which occurs over a period of time, said method comprising the steps of:

detecting discrete photons generated by successive light bursts during each sampling time in a series of sampling times;

counting the number of photons detected during a given sampling time to provide a photon count for said given sampling time; and

coupling each of said sampling times to a pulse height analyzing device to generate a probability distribution function at the conclusion of said sampling time series, said function indicating the probability that a particular photon count value will be generated by said light burst activity during a specified period of time.

14. The method of claim 13 wherein said light burst activity is generated by bioluminescent microorganisms contained in a quantity of seawater, and wherein:

said counting step comprises the step of counting the number of photons which are detected during each sampling time in a series of sampling times which are on the order of 1 millisecond.

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**4,303,411**

## FLUORINE-CONTAINING TRACERS FOR SUBTERRANEAN PETROLEUM AND MINERAL CONTAINING FORMATIONS

**Catherine S. H. Chen, Berkeley Heights; Yuhshi Luh, Trenton, and Kirk D. Schmitt, Pennington, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Dec. 31, 1980, Ser. No. 221,608**

**Int. Cl.³ G01N *24/08***

**U.S. Cl. 23—230 EP** **3 Claims**

1. The method for determining flow patterns within a subterranean formation penetrated by a spaced apart injection system and production system that comprises injecting into the formation at a predetermined depth from the injection system a saline solution containing a small amount of one or more water-soluble tracer compounds, recovering said saline solution in the production system, determining the depth of recovery, and identifying said tracer compounds by $^{19}$FNMR spectroscopy; said tracer compounds being water-soluble alkali metal salts of inorganic or organic compounds having fluorine in the anion.

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**4,303,412**

## METHOD AND APPARATUS FOR COMPRESSIVELY SEPARATING WASTE MATERIAL

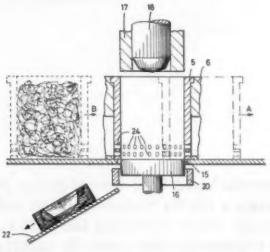
**Eugene M. A. Baikoff, Chemin des Anciens-Moulins 2A, 1009 Pully (Canton of Vaud), Switzerland**

**Filed Mar. 19, 1980, Ser. No. 131,723**

**Claims priority, application Switzerland, Mar. 27, 1979, 2835/79**

**Int. Cl.³ C10L *5/08*; B30B *9/06***

**U.S. Cl. 44—1 D** **14 Claims**



1. In a method of compressively separating waste material, particularly waste composed at least partially of organic matter, in order to extract liquid or semisolid sludge containing water with organic matter and/or biologically useful materials, on the one hand, and solid blocks of compressed waste which are cohesive enough to be stored and handled in use, particularly as fuel briquettes, comprising the steps of

placing in an open-ended receptacle a quantity of waste material to be treated, said receptacle having sludge extraction apertures,

plugging the open end of the filled receptacle by means of a piston arrangement,

closing the said sludge extraction apertures,

thereafter causing a first compression of the waste material in the receptacle by means of a displacement of the piston arrangement to reduce the closed volume of the receptacle without allowing any material to escape therefrom,

thereafter opening the sludge-extraction apertures, the cross-section of said apertures having a predetermined size so as to prevent the escape therethrough of non-flowable particles larger than said predetermined size, and

then causing a further compression of the waste material in the receptacle by further displacement of the piston arrangement until virtually all of the liquid, semisolid, or viscous material has escaped through said apertures,

said first and further compression steps being effected by providing the said receptacle and said piston arrangement

with such a structural conformation that the entire mass of waste material compressed in the receptacle is subjected to substantially uniform pressure, the internal contractions and shearings within the mass of waste material being effected without crushing and by a succession

of gradual elementary advances of the piston arrangement free of retractions and re-advances,

and subsequently removing the compressed mass of waste material from the receptacle in the form of a homogeneous, dry, and solid compressed block structure.

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**4,303,413**

## OXYGEN GAS GENERATOR AND METHOD OF MANUFACTURING THE GAS GENERATOR

**Frank A. Marion, Glendale, Ariz., assignor to Synergy Corporation, Phoenix, Ariz.**

**Filed Nov. 5, 1979, Ser. No. 91,412**
**Int. Cl.³ C10L *5/14, 5/44***
**U.S. Cl. 44—10 A** **23 Claims**

**1.** In combination in a dry mixture free from petroleum-based commponents,

a clay having non-hydrophyllic properties and having a percentage by weight no greater than approximately thirty-eight percent (38%) in the mixture,

an oxidizer having a percentage by weight no greater than approximately seventy-five percent (75%) in the mixture, and

a fuel having a cellulosic composition and having a percentage by weight no greater than approximately twenty percent (20%) in the mixture.

**3.** The combination set forth in claim **1**, wherein

the clay constitutes bentonite,

the oxidizer constitutes a chlorate and

the fuel constitutes corn cob and

the clay, the oxidizer and the fuel are the only materials in the combination.

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**4,303,414**

## AZIDO ADDITIVES FOR LIQUID HYDROCARBON MOTOR FUELS

**Milton B. Frankel, Tarzana, and Joseph E. Flanagan, Woodland Hills, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Filed Dec. 15, 1980, Ser. No. 216,394**
**Int. Cl.³ C10L *1/22***
**U.S. Cl. 44—63** **5 Claims**

**1.** A liquid hydrocarbon motor fuel comprising a minor portion of an azido compound of the general $N_3R_1$, wherein $R_1$ represents a radical selected from the group consisting of nitro alkyls, nitrado alkyls, and mixtures thereof.

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**4,303,415**

## GASIFICATION OF COAL

**William A. Summers, Munster, Ind., assignor to Lubille Energy Development Co., Ltd., Lansing, Ill.**

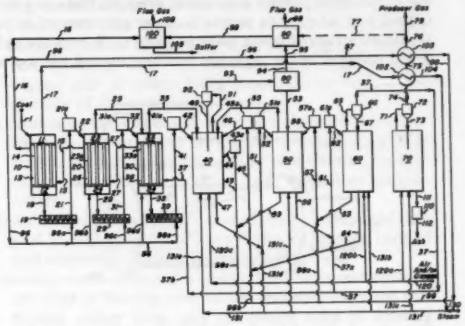
**Filed Sep. 29, 1980, Ser. No. 192,088**
**Int. Cl.³ C10J *3/00***
**U.S. Cl. 48—202** **22 Claims**

**1.** The process of gasifying clean coal particles at a low superatmospheric pressure, wherein the coal particles are converted to a gaseous fuel product and a substantially non-combustible ash in a series of elevated-temperature stages, comprising the steps of:

(a) drying the coal particles, in a drying stage at a temperature within the range from about 220° to about 300° F., in indirect heat exchange with a flue gas stream;

(b) transferring the dried coal particles to a heat treating stage and heat treating the dried coal particles therein at a temperature within the range from about 400° to about 700° F., in indirect heat exchange with a flue gas stream;

(c) transferring the heat-treated coal particles to a devolatilizing stage and devolatilizing the heat-treated coal particles therein at a temperature within the range from about 850° to about 1150° F., in indirect heat exchange with a flue gas stream, to yield an overhead volatiles stream and devolatilized coal char particles;



(d) transferring the devolatilized coal char particles, to a calcining stage and calcining the devolatilized coal char particles therein at a bed temperature within the range from about 1550° to about 1750° F., in contact with steam and a gaseous stream comprising an oxygen-containing gas, to yield an overhead calciner effluent gas stream and carbon-rich calcined coke particles;

(e) transferring the calcined coke particles to a gasifying stage and gasifying the calcined coke particles at a bed temperature of at least about 1650° F., in contact with steam, to yield an overhead gasifier gas stream and carbon-lean coke particles;

(f) transferring the overhead volatiles stream and the overhead gasifier gas stream to an upper zone of the calcining stage, whereby the respective streams and the calciner gas react further in contact with steam and the oxygen-containing gas and are mixed to form the calciner effluent gas stream;

(g) cooling, and optionally scrubbing, the calciner effluent gas stream to provide a normally liquid condensate fraction and a gaseous fuel product stream;

(h) transferring the normally liquid condensate fraction to the gasifying stage;

(i) transferring the carbon-lean coke particles to a heat generating stage and generating heat therein by combustion of a portion of the coke in contact with a gaseous stream comprising air, to provide heated coke particles and the flue gas stream;

(j) transferring a major portion of the heated coke particles to the gasifying stage, whereby requisite heat is supplied for the gasification of calcined coke particles and heated coke particles;

(k) withdrawing a minor portion of the heated coke particles to an agglomeration stage, wherein substantially complete conversion of residual coke to ash and a gas is effected; and

(l) discharging from the agglomeration stage a substantially non-combustible ash.

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**4,303,416**

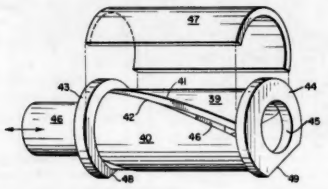
## PROCESS AND APPARATUS FOR THE MANUFACTURE OF SINTERED TUNGSTEN CARBIDE TOOL TIPS

**Karl S. Springborn, Wheeler's Hill, Australia, assignor to Austung Proprietary Limited, South Yarra, Australia**

**Filed Oct. 12, 1979, Ser. No. 84,296**
**Claims priority, application Australia, Oct. 20, 1978, PD6483**
**Int. Cl.³ B24D *17/00***
**U.S. Cl. 51—293** **16 Claims**

**1.** A sinter fixture for sintering shaped cutting tool bit insert blanks pressed from particulate tungsten carbide which com-

prises a generally spool-shaped shell split into two equal segments along separation cuts which are of the same configuration as the pressed and shaped blanks, each said segment having a cylindrical portion attached to a flanged end and a longitudinal bore adapted to receive a center pin common to both segments, a curved cover being adapted to fit over the cylindrical portions of the segments and bear against the top of a




pressed and shaped blank which is placed in a cavity formed between the separation cuts and the surface of the center pin.

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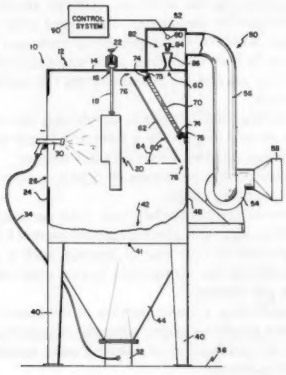
**4,303,417**

## SPRAY BOOTH WITH RECONDITIONING FILTER SYSTEM

**Robert L. Koch, II, Evansville, Ind., assignor to George Koch Sons, Inc., Evansville, Ind.**

**Filed Oct. 3, 1980, Ser. No. 193,744**
**Int. Cl.³ B01D *46/04***
**U.S. Cl. 55—96** **20 Claims**



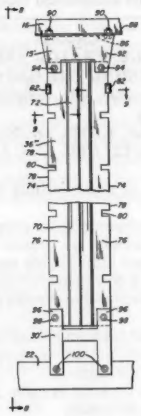

**19.** A method of maintaining a negative atmospheric pressure and collecting undeposited coating material in a spraying system of the type including a spray booth and a spray gun for depositing coating material to articles, comprising the steps of pulling the atmosphere from within the spray booth through a vent opening in a first direction to maintain a negative pressure within the spray booth, and collecting undeposited coating material in the atmosphere by deflecting undeposited coating material off a baffle positioned between the spray gun and the vent opening and allowing it to fall by gravity into a collection hopper, accumulating substantially all remaining undeposited coating material in a filter media positioned between the baffle and the vent opening, and periodically directing a pulse of air through the filter media in a second direction from a source of compressed air positioned between the filter media and the fan to dislodge the accumulated coating material in the filter media and allow it to fall by gravity into the collection hopper.

**4,303,418**

## DISCHARGE ELECTRODE IN PRECIPITATOR

**Everett L. Coe, Jr., Downey, Calif., assignor to Joy Manufacturing Company, Pittsburgh, Pa.**

**Continuation of Ser. No. 788,171, Apr. 18, 1977, abandoned.**
**This application Dec. 26, 1979, Ser. No. 107,298**
**Int. Cl.³ B03C *3/04***
**U.S. Cl. 55—145** **12 Claims**



**1.** In an electrostatic precipitator including a gas flow path which is adapted to have a stream of gas passed therethrough wherein said precipitator includes a corona generating means having at least one collector electrode extending adjacent such gas flow path and at least one elongated discharge electrode which includes an elongated discharge electrode body having within its major lateral exent transverse to the longitudinal extent thereof a pair of longitudinally extending, laterally spaced edge portions and a nondischarging intermediate portion wherein said edge portions extend inwardly from the laterally outermost edges of said body and at least one of said edge portions includes thereon corona discharge means and said nondischarging intermediate portion extends laterally between said edge portions, and wherein said discharge electrode is disposed in spaced relationship with respect to said collector electrode across a portion of such gas flow path and oriented such that said intermediate portion resides in generally parallel relationship with respect to said collector electrode and with respect to the direction of gas flow through such portion of such gas flow path, the improvement comprising:

said intermediate portion of said discharge electrode including a pair of substantially planar side portions substantially longitudinally coextensive with said body and disposed adjacent the respective said edge portions and a longitudinally extending formed stiffener means disposed centrally of said intermediate portion intermediate said side portions and protruding laterally outwardly of each of said side portions.

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**4,303,419**

## METHOD AND COMPOSITION FOR DETERMINATION OF N-NITROSAMINES

**Clyde W. Frank; Paul J. Nord, and Robert D. Cox, all of Iowa City, Iowa, assignors to University of Iowa Research Foundation, Iowa City, Iowa**

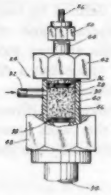
**Division of Ser. No. 108,236, Dec. 28, 1979, Pat. No. 4,256,462.**
**This application Jul. 7, 1980, Ser. No. 166,382**
**Int. Cl.³ B01D *19/00*; G01N *21/76, 35/08, 37/00***
**U.S. Cl. 55—185** **5 Claims**

**1.** A degassing cell designed specifically for handling very

small liquid volumes and separation of gas from said liquid for subsequent analytical determinations, said cell being particularly adapted to use in continuous flow, small volume, analysis systems, comprising:

a small volume vessel having an exterior wall which defines an internal mixing chamber, said vessel having a gas inlet means at one end thereof adapted to connect to a gas supply source, a liquid inlet means downstream of said gas inlet means and a materials exit means at the other end thereof;

a first porous frit in said mixing chamber adjacent said gas



inlet means and situated across the longitudinal axis of said vessel;

a second porous frit positioned in said chamber downstream of said liquid inlet means, adjacent said materials exit means and situated across the longitudinal axis of said vessel, said liquid inlet means being connected to said vessel wall at a point between said first and second porous frits; and;

the remaining interior space of said mixing chamber being substantially filled with filler material to decrease the chamber volume, put porosity in said chamber and facilitate mixing and gas removal.

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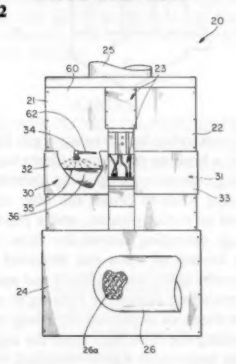
**4,303,420**

## AIR TREATMENT APPARATUS

**Arthur G. Howard, 7711 Newport Way, Apt. D, Indianapolis, Ind. 46250**

**Filed Jan. 14, 1980, Ser. No. 111,825**
**Int. Cl.³ B01D *46/18***
**U.S. Cl. 55—242** **27 Claims**




1. A fluid treatment apparatus for removing particulate matter from a flow stream, said fluid treatment apparatus comprising:

a housing enclosure disposed in a fluid flow stream and arranged into two, spaced-apart flow chambers which further define a clearance region therebetween, said flow chambers sharing a common inlet and a common outlet which are in flow communication with said fluid flow stream, said housing enclosure adapted to divide any entering flow into two flow branches, a different flow branch extending through each flow chamber;

a plurality of drive shafts extending across said clearance region and into each of said flow chambers;

a plurality of filter support rollers arranged in each flow chamber, rollers of one flow chamber being aligned with corresponding rollers of the other flow chamber, each aligned pair of rollers being supported on one of said plurality of drive shafts;

a continuous belt of filtering material disposed in each flow chamber and arranged across the corresponding flow branch, each of said continuous belts of filtering material being cooperatively arranged over said filter support rollers;

drive means disposed within said clearance region and coupled to said plurality of drive shafts for moving each of said continuous belts of filtering material; and

cleaning means arranged in cooperation with said continuous belts of filtering material for removing collected particulate matter from said continuous belts of filtering material.

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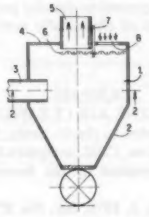
**4,303,421**

## DECANTATION CYCLONES

**Manlio Cerroni, Via Bruxelles, 53 Roma, Italy**

**Filed Mar. 14, 1980, Ser. No. 130,432**
**Claims priority, application Italy, Mar. 16, 1979, 48393 A/79**
**Int. Cl.³ B01D *46/04***
**U.S. Cl. 55—290** **8 Claims**




1. A decantation cyclone for the separation of air from solid material including lightweight sheet paper and sheet plastic transported thereby wherein the cyclone includes a cylindrical hollow body having a roof and floor, an inlet opening tangentially to the interior of said body, an outlet formed in the roof, movable filter means within the body and arranged adjacent the outlet and spaced from the inlet to intercept flow from the interior of the body through the outlet, whereby to intercept the lighter solids carried by said air prior to entry thereof into the outlet preventing blockage thereof, said filter means comprising a grid having a relatively large mesh size, said grid comprising a disc-like filter arranged in a plane transverse the outlet and being movable rotatably transverse the outlet about an axis offset from the axis of the outlet, means for rotating said grid in said plane and air intake means located offset from said outlet radially of the axis of rotation of said grid to backflush the disc-like filter driving any intercepted material thereon toward the floor of the hollow body.

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**4,303,422**

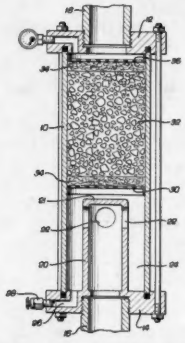
## FUEL FILTER

**James G. Persinger, Hugoton, Kans., assignor to Fuel Inc., Hugoton, Kans.**

**Filed May 22, 1980, Ser. No. 152,385**
**Int. Cl.³ B01D *53/04, 53/26***
**U.S. Cl. 55—319** **3 Claims**

1. In a fuel filter device for removing contaminants comprising formation water, hydrogen sulfide, sulfur and iron sulfide,

from a natural gas fuel supply, said filter including a cylindrical, hollow body having a bed of chemically active molecular sieve material disposed in an upper portion of said body and a tubular member extending upwardly from a central aperture provided in a lower end cap, and a chamber concentric with said member disposed in a lower portion of said body, the improvement comprising a plurality of holes provided in side



walls of said tubular member said holes being tapered at about a 15° angle diverging toward the exterior surface of said tubular member, and said molecular sieve material comprising pellets of an alkyl metal amino silicate combined with an inert binder, wherein when natural gas fuel flows through said holes the fuel undergoes an expansion thereby producing a dispersed flow through said bed of chemically active molecular sieve material.

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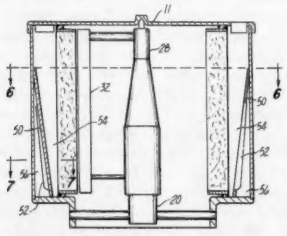
**4,303,423**

## ENGINE AIR CLEANER

**Harry R. Camplin, Marine on the St. Croix, Minn., and Michael A. Shackleton, San Jose, Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Feb. 3, 1978, Ser. No. 874,731**
**Int. Cl.³ B01D *45/12***
**U.S. Cl. 55—337** **3 Claims**



**1.** In an engine air cleaner comprising a housing that includes a cylindrical side wall **(10)** defining the housing axis, and first and second end walls **(11** and **13)**, an annular porous cleaning medium **(12)** disposed within said housing, the outer peripheral surface of the cleaning medium being spaced radially inwardly from the cylindrical housing side wall to define an annular inlet chamber therebetween; said first end wall **(11)** having a large number of circumferentially spaced air inlet guide louvers acutely angled to a radial plane taken at right angles to the housing axis, whereby dust-laden air is caused to take a helical swirling motion as it moves into the inlet chamber, a dust scavenger outlet tube **(14)** having a tangential connection with the cylindrical side wall at a point near said second end wall **(13)**, and a scavenger exhaust fan **(40)** connected to the outlet tube for drawing at least some of the dust particles out of the air cleaner before such dust particles can make contact with the cleaning medium: the improvement comprising a baffle means extending within the annular inlet chamber to confine the air-dust layer adjacent the housing side wall to a helical flow pattern while said layer is advancing toward the second end wall; said baffle means comprising a perforated circular wall structure **(50)** extending from the second end wall toward the first end wall within the inlet chamber, said perforated wall structure subdividing said inlet chamber into an outer annular space **(56)** adjacent the housing side wall and an inner annular space **(54)** adjacent the cleaning medium, the perforations in said wall structure being defined by vanes **(52)** acutely angled outwardly from the general plane of the wall structure, whereby swirling fluid has an easy mode of entry from the inner space to the outer space but a difficult mode of entry from the outer space to the inner space; said vanes being oriented in the same circumferential direction as the aforementioned louvers, whereby the vanes present minimal resistance to the swirl pattern generated by the louvers.

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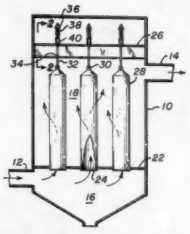
**4,303,424**

## FILTER BAG APPARATUS HAVING AN IMPROVED FABRIC FILTER BAG TENSIONING APPARATUS

**Louis B. Wheeler, Birmingham, Ala., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Sep. 8, 1980, Ser. No. 185,031**
**Int. Cl.³ B01D *46/02***
**U.S. Cl. 55—365** **2 Claims**

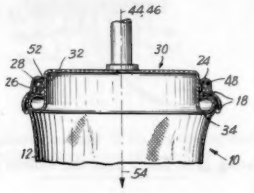


**1.** In a filter apparatus for cleaning a gas laden with solid particles having a housing defining a filter chamber therein, a tube sheet having a plurality of openings therein and extending across the housing so as to divide the filter chamber into an inlet plenum and an outlet plenum, and a plurality of tubular fabric filter bags extending outwardly from the tube sheet, each filter bag having an open end mounted to one of said openings in the tube sheet and a closed end suspended from a support beam extending across the housing in spaced relationship to the tube sheet, an improved filter bag tensioning apparatus for suspending the filter bags from the support beam and holding the filter bags under a predetermined tension comprising: a hanger rod extending axially from the closed end of each filter bag through an aperture in the support beam; spring means disposed about each hanger rod for biasing each hanger rod axially relative to the support beam so as to hold each filter bag in a taut condition; compression means positioned and arranged with respect to the spring means for compressing said spring means to provide the desired bias; and tension release means for removing the compression on said spring means, said tension release means disposed about the hanger rod between said spring means and the support beam.

## 4,303,425
## FILTER BAG ASSEMBLY

Louis F. Cox, Jr., Augusta, Ga., assignor to Menardi-Southern Corp., Augusta, Ga.

Filed Dec. 3, 1979, Ser. No. 99,780
Int. Cl.³ B01D 46/02
U.S. Cl. 55—378 13 Claims




1. A combination of a filter bag assembly and a termination cap, comprising:

a termination cap including a body element and a locking member, said locking member surrounding said body element and extending transversely outwardly;

a filter bag element, said filter bag element having an open end and a cuff forming a hollow casing at said open end;

a closed ring supported within said cuff at said open end, said ring being essentially inelastic, at least one transverse dimension of said closed ring exceeding the corresponding transverse dimension of said body element but being less than the corresponding transverse dimension of said locking member;

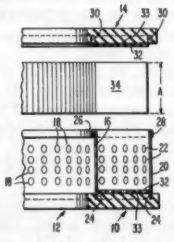
an elastic member supported within said cuff in a position surrounding said filter bag element at its open end and dimensioned to sealingly engage said filter bag element against said body element,

said elastic member surrounds said body element and presses said filter bag element sealingly against said body element, and said ring surrounds said body element, and said ring and locking member dimensions cause interference between said ring and said locking member, said interference maintaining the connection of said filter bag assembly with said termination cap during passage of a flow medium through said filter bag element and preventing flow forces from affecting said seal between said body element and said elastic member.

## 4,303,426
## AUTOMOBILE AIR FILTER HAVING REPLACEABLE AND READILY DISPOSABLE FILTER ELEMENT

Robert Battis, 2104 Klockner Rd., Hamilton Square, N.J. 08690

Filed Mar. 14, 1980, Ser. No. 130,292
Int. Cl.³ B01D 46/52
U.S. Cl. 55—498 6 Claims




6. An air filter comprising:

(a) a retaining assembly having an annular filter element chamber, a portion of said assembly being removable to provide access to said chamber; and

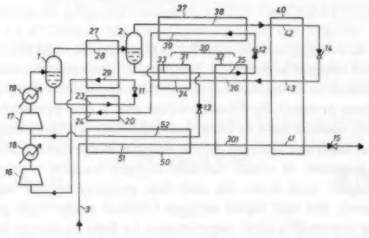
(b) a filter element seating in said chamber, said element being insertable and removable through the area of said assembly normally occupied by the removable portion thereof,

said assembly including confronting, annular support rings and a pair of concentric, annular screen elements extending between said rings and cooperating therewith to form said chamber, one of the rings comprising the removable portion of the assembly, the screen elements being secured along one edge thereof to the other ring, said one ring having a pair of annular grooves opening toward the other ring, said grooves being concentric with and radially spaced correspondingly to the screen elements, said other edges of the screen elements being snugly and removably seated in said grooves, whereby to facilitate removal of said portion of the filter element retaining assembly.

## 4,303,427
## CASCADE MULTICOMPONENT COOLING METHOD FOR LIQUEFYING NATURAL GAS

Heinrich Krieger, Leitlestrasse 16, 8100 Garmisch-Partenkirchen, Fed. Rep. of Germany

Continuation of Ser. No. 808,621, Jun. 21, 1977, abandoned.
This application Mar. 22, 1979, Ser. No. 23,089
Claims priority, application Fed. Rep. of Germany, Jun. 23, 1976, 2628007
Int. Cl.³ F25J 1/02
U.S. Cl. 62—9 4 Claims




1. A cooling method that comprises cooling circuit means, wherein a circulating cooling medium is compressed and cooled by an ambient cooling fluid and is condensed, expanded, warmed and evaporated, including at least one cooling circuit which is an incorporated cascade circuit that includes a fractional condensation wherein the cooling medium is partially condensed in a first heat exchange constituting an evaporative heat exchange with expanded and evaporating cooling medium and the partially condensed cooling medium is separated into its liquid and gaseous phases, the separated liquid phase being supercooled in a second heat exchange constituting a counter-current supercooling heat exchange, and being expanded and warmed to evaporate in a third heat exchange constituting a countercurrent evaporative heat exchange, and the separated gaseous phase is totally condensed in said third heat exchange, expanded and warmed in said second heat exchange, the warming of the expanded cooling medium in said second heat exchange and the warming of the expanded cooling medium in said third heat exchange being performed essentially in parallelism and said second and third heat exchanges being essentially thermally segregated from one another, the cooling medium in the incorporated cascade circuit being compressed in a plurality of compression stages to a relatively high pressure and cooling medium supercooled in said second heat exchange being expanded to a relatively intermediate pressure and recirculated to the input of a compression stage arranged downstream the first compression stage and the cooling medium totally condensed in said third

heat exchange being supercooled, expanded to a relatively low pressure, warmed in said second heat exchange and recirculated to the input of the first compression stage.

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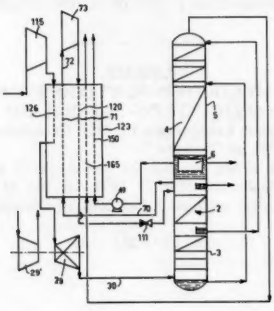
**4,303,428**

## CRYOGENIC PROCESSES FOR SEPARATING AIR

**Gerard Vandenbussche, Fontenay-sous-Bois, France, assignor to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France**

**Filed Jul. 10, 1980, Ser. No. 168,369**
**Claims priority, application France, Jul. 20, 1979, 79 18772**
**Int. Cl.³ F25J *3/04***
**U.S. Cl. 62—13** **12 Claims**



**1.** In a cryogenic process for separating air with the production of oxygen under high pressure, of the kind in which air is separated in a cryogenic separation apparatus comprising a medium-pressure upstream section and a low-pressure downstream section into at least one fraction rich in nitrogen and into at least one fraction rich in oxygen in the liquid state under low pressure, in which the said oxygen fraction is pumped in the liquid state from the said low pressure to the said high pressure, the said liquid oxygen fraction under high pressure being exposed to total vaporization by heat exchange in counterflow with fluids one of which is a first fluid which comprises at least one of the two principal components of air, and during the said exchange is under a high pressure of the order of the said high pressure, and is then expanded to the said medium pressure before being fed in an at least partially liquid state into at least one said separation section, and the other of which is a second fluid comprising air under an intermediate pressure greater than said medium pressure but also lower than said high pressure, and is fed in the gaseous state into said upstream separation section; the improvement in which an expansion of all of said second fluid to said medium pressure is carried out in turbine means at an intermediate temperature between the hot and cold temperature of said heat exchange.

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**4,303,429**

## APPARATUS AND METHOD FOR PRODUCTION OF MINERAL FIBERS

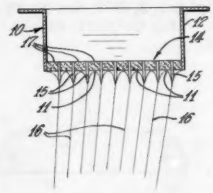
**Arnold J. Eisenberg, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Sep. 8, 1980, Ser. No. 185,106**
**Int. Cl.³ C03B *37/025***
**U.S. Cl. 65—1** **18 Claims**

**17.** Method of producing glass fibers comprising:

(a) moving molten glass through a porous member to form a layer of molten glass at a surface thereof from which projects elongated members;

(b) flowing molten glass of the layer to the projected end regions of the members; and



(c) attenuating glass fibers from the molten glass at the end regions.

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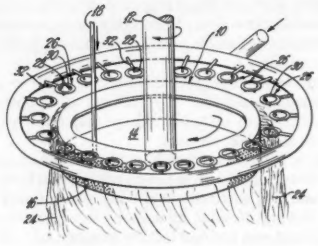
**4,303,430**

## METHOD AND APPARATUS FOR FORMING MINERAL FIBERS

**Robert L. Houston, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Mar. 6, 1980, Ser. No. 127,706**
**Int. Cl.³ C03B *37/04***
**U.S. Cl. 65—6** **15 Claims**



**10.** The method of forming fibers comprising centrifuging molten mineral material into primary fibers **(20)** with a rotating spinner **(10)**, and further attenuating said primary fibers **(20)** into secondary fibers **(24)** by exerting attenuation forces in different directions at different loci **(38, 40, 42, 44)** within each of a plurality of zones **(36)** of turbulent gasesous flow, said zones **(36)** being positioned circumferentially of said spinner **(10)**.

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**4,303,431**

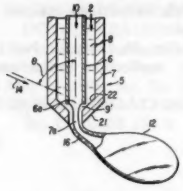
## METHOD AND APPARATUS FOR PRODUCING HOLLOW MICROSPHERES

**Leonard B. Torobin, c/o Materials Technology Corp., P.O. Box 6844, Bellevue, Wash. 98007**

**Continuation of Ser. No. 59,297, Jul. 20, 1979, abandoned, which is a continuation-in-part of Ser. No. 937,123, Aug. 28, 1978, abandoned, and a continuation-in-part of Ser. No. 944,643, Sep. 21, 1978, abandoned. This application May 23, 1980, Ser. No. 152,693**
**Int. Cl.³ C03B *19/10*; C03C *25/02***
**U.S. Cl. 65—21.4** **59 Claims**

**1.** A method for making hollow microspheres from an inorganic film forming material which comprises heating said material, forming a liquid film of said material across an orifice, applying a blowing gas at a positive pressure on the inner surface of the liquid film to blow the film and form the microsphere, subjecting the microsphere during its formation to an

external pulsating or fluctuating pressure field having periodic oscillations, said pulsating or fluctuating pressure field acting



on said microsphere to assist in its formation and to assist in detaching the microsphere from said orifice.

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**4,303,432**

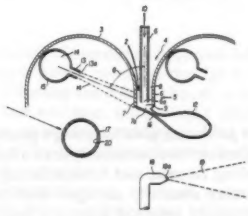
## METHOD FOR COMPRESSING GASEOUS MATERIALS IN A CONTAINED VOLUME

**Leonard B. Torobin, Materials Technology Corp., P.O. Box 6844, Bellevue, Wash. 98007**

**Continuation of Ser. No. 69,295, Aug. 24, 1979, abandoned, which is a continuation-in-part of Ser. No. 59,297, Jul. 20, 1979, abandoned, which is a continuation-in-part of Ser. No. 944,643, Sep. 21, 1978, abandoned, which is a continuation-in-part of Ser. No. 937,123, Aug. 28, 1978, abandoned. This application Aug. 18, 1980, Ser. No. 179,151**

**Int. Cl.³ C03B *19/10*; C03C *25/02***

**U.S. Cl. 65—21.4** **66 Claims**



1. A method for compressing and encapsulating gaseous materials at elevated pressures in hollow microspheres made from inorganic film forming material which comprises heating said inorganic film forming material, forming a liquid film of said material across an orifice, applying a blowing gas at a positive pressure of above 50 p.s.i.g. to the inner surface of the liquid film to blow the film and form the microsphere, subjecting the microsphere during its formation to an external pulsating or fluctuating pressure field having periodic oscillations, said pulsating or fluctuating pressure field acting on said microsphere to assist in its formation and to assist in detaching the microsphere from said orifice.

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**4,303,433**

## CENTRIFUGE APPARATUS AND METHOD FOR PRODUCING HOLLOW MICROSPHERES

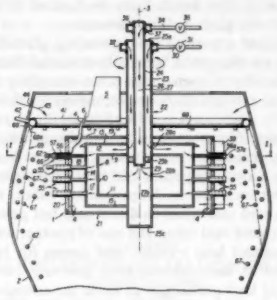
**Leonard B. Torobin, c/o Materials Technology Corp., P.O. Box 6844, Bellevue, Wash. 98001**

**Continuation of Ser. No. 77,720, Sep. 21, 1979, abandoned, which is a continuation-in-part of Ser. No. 69,295, Aug. 24, 1979, abandoned, and Ser. No. 59,296, Jul. 20, 1979, abandoned, and Ser. No. 59,297, Jul. 20, 1979, abandoned, and Ser. No. 944,643, Sep. 21, 1978, abandoned, and Ser. No. 937,123, Aug. 28, 1978, abandoned. This application Aug. 18, 1980, Ser. No. 179,158**

**Int. Cl.³ C03B *19/10*; C03C *25/02***

**U.S. Cl. 65—21.4** **72 Claims**

1. A method for making hollow microspheres from inorganic or organic film forming material which comprises feeding said material to a centrifuge apparatus comprising a rotor, rotating said rotor about a central axis, forming a liquid film of said material across an orifice disposed in or carried on the peripheral wall of said rotor, applying a blowing gas at a positive pressure on the inner surface of the liquid film to blow the film and form the microsphere, subjecting the microsphere



during its formation to an external pulsating or fluctuating pressure field having periodic oscillations, said pulsating or fluctuating pressure field acting on said microsphere to assist in its formation and to assist in detaching the microsphere from said orifice.

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**4,303,434**

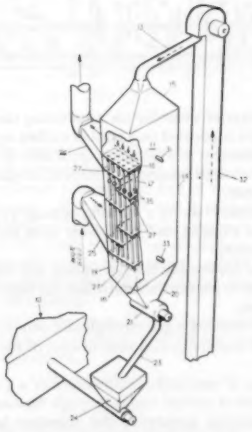
## METHOD AND APPARATUS FOR PREHEATING PULVEROUS MATERIALS PRIOR TO THEIR INTRODUCTION INTO A MELTING FURNACE

**Robert R. Rough, Sr., Toledo, and Duane C. Nugent, Perrysburg, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio**

**Continuation-in-part of Ser. No. 185,117, Sep. 8, 1980, abandoned. This application Dec. 11, 1980, Ser. No. 215,478**

**Int. Cl.³ C03B *3/00***

**U.S. Cl. 65—27** **35 Claims**



1. The process of preheating glass batch prior to its delivery to a glass melting furnace comprising the steps of introducing the fully-intermixed glass batch constituents into the upper region of a tubular heat exchanger, allowing the glass batch to flow downwardly by gravity through a plurality of open-ended tubes of said heat exchanger, passing hot gases upwardly through said heat exchanger around said open-ended tubes to

heat the glass batch contained therein by countercurrent indirect heat transfer, increasing the internal pressure within an upper region of said heat exchanger by a gaseous fluid to thereby force the contained moisture downwardly, venting the contained moisture from within said glass batch exteriorly of said heat exchanger at a lower region thereof, and delivering the said heated glass batch from the bottom of said heat exchanger into the glass melting furnace.

**11.** Combined apparatus for preheating glass furnace batch comprising an elongated vertically-mounted heat exchanger having a plurality of open-ended tubes extending throughout a major central portion of its height, means for delivering glass batch in fully intermixed condition to an upper region of said heat exchanger for its passage by gravity through said open-ended tubes, means for introducing hot gases from said glass furnace into a lower region of said heat exchanger to circulate upwardly between the said open-ended tubes, baffle means mounted around said tubes to direct said hot gases in a circuitous path around said tubes and out of contact with said glass batch for indirect heat transfer, and means for introducing a gaseous fluid at super-atmospheric pressure into the upper region of said heat exchanger to force the contained moisture downwardly, venting means located adjacent the lower end of said open-ended tubes to separate the contained moisture from said glass batch, and means for delivering the said glass batch to said glass furnace in essentially moisture-free preheated condition.

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**4,303,435**

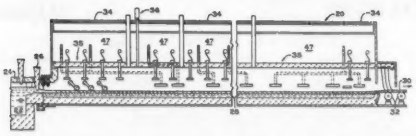
## GLASS RIBBON FLOAT TANK WITH A PYROMETER ASSEMBLY HAVING A HEATED VIEWING TUBE AND METHOD OF USE

**George E. Sleighter, Natrona Heights, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation of Ser. No. 22,654, Mar. 22, 1979, Pat. No. 4,259,866. This application Dec. 1, 1980, Ser. No. 211,597**

**Int. Cl.³ C03B** *18/18*

**U.S. Cl. 65—29** **13 Claims**



**1.** A pyrometer assembly for monitoring the temperature of a glass ribbon supported on a pool of molten metal contained in a forming chamber of a flat glass apparatus, the forming chamber having a vapor atmosphere therein, comprising:

a pyrometer;

heating means having a viewing passageway therethrough;

means for aligning said pyrometer with the passageway of said heater;

means for connecting the pyrometer and said heater to one another to prevent uncontrolled movement of gas therebetween;

means for moving a gas through said connecting means; and

means for mounting said tube in roof of the forming chamber.

**8.** Method of measuring temperature of a glass ribbon moving on a pool of molten metal through forming chamber of a flat glass making apparatus, the chamber having a heated vapor atmosphere, comprising the steps of:

viewing the ribbon through heating means by way of temperature sensing means;

heating the heating means to a temperature greater than the dew point of the vapor atmosphere to prevent condensation of the vapors in the heating means; and

moving a purge gas through the heating means to move the vapors out of the heating means.

**4,303,436**

## PROCESS AND APPARATUS FOR THE PRODUCTION OF GLASS FOIL

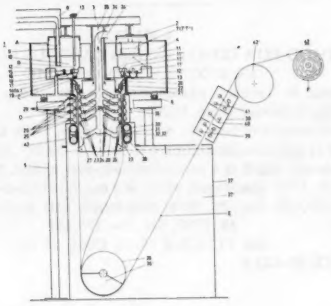
**Quido Rossi, Zurich, Switzerland, assignor to Micafil AG, Zurich, Switzerland**

**Filed Oct. 20, 1980, Ser. No. 199,086**

**Claims priority, application Switzerland, Oct. 22, 1979, 9440/79**

**Int. Cl.³ C03B** *19/00, 40/04*

**U.S. Cl. 65—67** **9 Claims**



**2.** A process for producing glass foil using a gaseous blowing agent wherein a glass melt is continuously drawn from a heated crucible of a smelting furnace, said furnace having a distribution reservoir feeding annularly arranged distributing slots, having circumferentially arranged conveyor belts, having a draw-off guide roller arranged in a hot bath of liquids, and having an after-treatment zone for treating the glass foil, comprising the steps of:

(a) heating glass in a smelting furnace until the glass reaches its melting point, and then conveying the glass through a distribution reservoir to annularly arranged distributing slots such that a plurality of jets of glass emerge from the distributing slots;

(b) combining the plurality of jets of glass emerging from the distributing slots at a funnel-shaped wall to form a hollow, cylindrical mass of glass;

(c) flowing the hollow, cylindrical mass of glass downward due to its own weight through a heating and cooling zone, said zone being under pressure and being gas-heated, cooling off the glass for shaping, and grasping the hollow, cylindrical mass of glass with circumferentially arranged auxiliary conveyor belts;

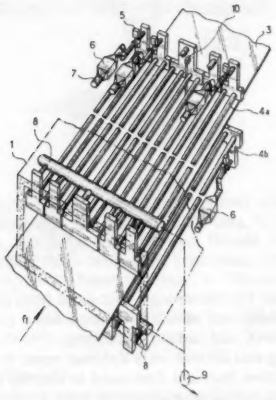
(d) stretching the hollow, cylindrical mass of glass while still in its plastic state to a predetermined wall thickness with the auxiliary conveyor belts, then separating the hollow, cylindrical mass of glass on one side with a separating device and bending the mass of glass into a substantially planar mass of glass, and then conveying the planar mass of glass to a hot bath of liquids wherein a draw-off guide roller is arranged to draw-off glass foil in full width; and

(e) conveying glass foil drawn-off by the draw-off guide roller from the bath of liquids through an after-treatment zone wherein the glass foil is treated to a coiling device, and then coiling the treated glass foil.

## 4,303,437
## PROCESS FOR THE ADJUSTMENT OF THE GLASS TEMPERATURE IN A FLOAT GLASS LEHR AND FLOAT GLASS LEHR IN ORDER TO BRING THIS PROCESS INTO OPERATION

**Jean P. Garcelon, Paris, France, assignor to Stein Surface, Ris Orangis, France**

**Filed May 15, 1980, Ser. No. 150,238**
**Claims priority, application France, May 16, 1979, 79 13281**
**Int. Cl.³ C03B *25/04***
**U.S. Cl. 65—99 A** **7 Claims**




1. In a method of operating a float glass lehr in which a float glass ribbon is passed on rollers through a lehr tunnel and is subjected to heating and cooling therein, and wherein arrays of tubes for heat exchange are provided above and below the glass ribbon, said tubes extending parallel to the direction of movement of the glass ribbon through the lehr, the improvement which comprises:

(a) forming each array in sets of mutually parallel transversely spaced coplanar tubes in successive zones along said path and grouping a plurality of tubes of each array for the respective zone in groups whereby for each array and each zone a respective plurality of such groups is disposed transversely of the direction of movement of the glass ribbon through the lehr;

(b) heating air separately for each of said groups and admitting the heated air to the tubes of each group at an upstream end of the respective zone with respect to said direction of movement of the glass ribbon through said lehr;

(c) drawing heated air from the downstream ends of the tubes of each zone; and

(d) measuring the temperature of the glass ribbon at the upstream end of each zone and selectively controlling the rates of flow through the respective groups of tubes in response to the measured temperature, thereby maintaining temperature homogeneity of the glass ribbon.

3. A float glass lehr for the heat treatment of a float glass ribbon, said lehr comprising:

an elongated lehr tunnel;

a multiplicity of rollers spaced apart longitudinally of said tunnel but extending transversely therein and forming a path along which said ribbon is displaced on said rollers;

a lower array of longitudinally extending, mutually parallel coplanar heat-exchange tubes disposed below said path, and an upper array of mutually parallel coplanar transversely spaced heat-exchange tubes disposed above said path within said tunnel, each of said arrays being subdivided longitudinally into respective zones, each zone having an upstream side and a downstream side with respect to the direction of travel of said ribbon along said path;

means connecting a plurality of tubes of each array and each zone in a respective group whereby, for each zone, each of said arrays comprises a plurality of such groups in succession transversely of said direction;

a respective air heater communicating with the tubes of each group at an upstream end of the respective zone whereby heated air flows through said tubes in a direction opposite the direction of movement of said glass ribbon along said path;

means at the downstream end of each of said zones for drawing air from said tubes; and

means at the upstream end of each zone for measuring the temperature of the glass ribbon and controlling selectively the heating effect contributed by each group to said glass ribbon.

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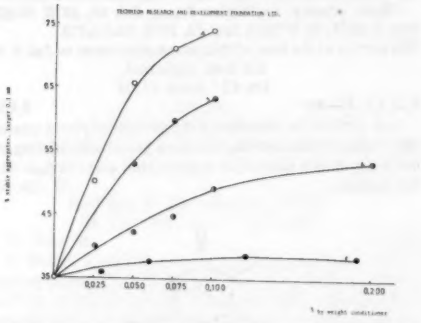
## 4,303,438
## METHOD FOR STABILIZATION OF SOIL AGGREGATES

**Dan Zaslavsky, and Lev V. Rozenberg, both of Haifa, Israel, assignors to Technion Research & Development Foundation, Ltd., Haifa, Israel**

**Continuation-in-part of Ser. No. 748,367, Dec. 7, 1976, abandoned. This application Oct. 23, 1978, Ser. No. 953,799**
**Claims priority, application Israel, Dec. 18, 1975, 48686**
**The portion of the term of this patent subsequent to Jun. 30, 1998, has been disclaimed.**
**Int. Cl.³ C05G *3/04***
**U.S. Cl. 71—27** **5 Claims**




1. A method for improving a soil structure by stabilization of aggregates which consists of applying a soil conditioner comprising a graft polymer substantially free of monomer, having an intrinsic viscosity of 0.33–0.43 and a molecular weight lower than 100,000, said polymer being obtained by the exothermic reaction of a water soluble lignosulfonate with a member selected from the group consisting of acrylic acid, methacrylic acid and mixtures thereof at a pH between 1.5 to 4 in the presence of an initiator.

3. A method for improving a soil structure by stabilization of aggregates according to claim 1, carried out simultaneously with fertilizer application.

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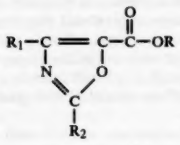
## 4,303,439
## 2-SUBSTITUTED-4-ALKYL OR TRIHALOALKYL-5-OXAZOLECARBOXYLIC ACIDS AS SAFENING AGENTS

**Robert K. Howe, Bridgeton, and Len F. Lee, Maryland Heights, both of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Oct. 1, 1979, Ser. No. 80,747**
**Int. Cl.³ A01N *43/76*; C07D *263/38, 263/34***
**U.S. Cl. 71—88** **11 Claims**

1. A method of reducing injury to rice plants due to applica-

tion thereto of butachlor herbicide which comprises applying to the plant locus a safening effective amount of a compound having the formula



wherein R is hydrogen, alkyl containing 1 to 5 carbon atoms or agriculturally acceptable cations; $R_1$ is alkyl containing 1 to 5 carbon atoms or trifluoromethyl; $R_2$ is halogen.

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**4,303,440**

## USE OF ISOUREA DERIVATIVES AND TRIAZINE DERIVATIVES IN COMBINATION WITH GIBBERELLINS AS PLANT GROWTH REGULATORS

**Kozo Oyamada; Takashi Matsui; Junzo Tobitsuka, all of Hiromachi; Yoshio Yamazaki, and Mzsami Ogawa, both of Yasumachi, all of Japan, assignors to Sankyo Company Limited, Tokyo, Japan**

**Continuation of Ser. No. 891,027, Mar. 28, 1978, Pat. No. 4,211,550, which is a continuation of Ser. No. 703,963, Jul. 9, 1976, abandoned. This application Aug. 16, 1979, Ser. No. 67,147**

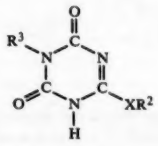
**Claims priority, application Japan, Jul. 16, 1975, 50-87030; Sep. 5, 1975, 50-107823; Sep. 22, 1975, 50-114473**

**The portion of the term of this patent subsequent to Jul. 8, 1997, has been disclaimed.**

**Int. Cl.[3] A01N *43/08***

**U.S. Cl. 71—89** **8 Claims**

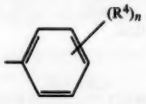
1. A method for stimulating the growth of plants consisting essentially of administering thereto a growth stimulating effective amount of a mixture of a gibberellin and a lactam having the formula



wherein

$R^2$ represents a lower alkyl group, a lower alkenyl group, a lower alkynyl group or a benzyl group;

$R^3$ represents a lower alkyl group, a cyclohexyl group or a group of the formula:



in which

$R^4$ represents a lower alkyl group, a lower alkoxy group or a halogen atom and

n is 0, 1, 2 or 3; and

X represents an oxygen or a sulfur atom, wherein the amount of said lactam is from 0.5 to 100 parts by weight per part by weight of gibberellin.

**4,303,441**

## METAL RECOVERY PROCESS

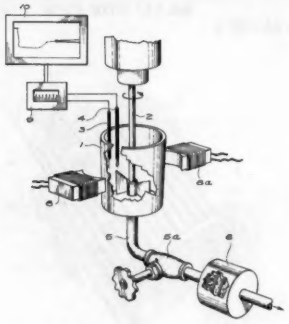
**Michel G. Lamisse, Champigny-sur-Marne, France, assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 20, 1980, Ser. No. 198,573**

**Claims priority, application France, Oct. 23, 1979, 79 26214**

**Int. Cl.[3] C22B *11/04***

**U.S. Cl. 75—109** **12 Claims**



1. In a method for recovering a first metal from an aqueous solution containing ions of said first metal and a complexing agent for said ions, said method comprising:

(a) contacting said solution with a second metal that is more electropositive than said first metal to thereby provide a metal-metal exchange reaction to form a precipitate of said first metal, and

(b) separating said precipitate from said solution; the improvement comprising:

(c) measuring the redox potential of said solution during the course of said exchange reaction, and

(d) initiating the separation of said precipitate from said solution when said redox potential is substantially at a predetermined minimum value.

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**4,303,442**

## DIAMOND SINTERED BODY AND THE METHOD FOR PRODUCING THE SAME

**Akio Hara, and Shuji Yazu, both of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

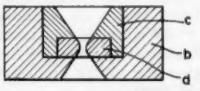
**Filed Aug. 24, 1979, Ser. No. 69,575**

**Claims priority, application Japan, Aug. 26, 1978, 53-104016; Sep. 27, 1978, 53-119685; Nov. 17, 1978, 53-142657**

**The portion of the term of this patent subsequent to Oct. 23, 1996, has been disclaimed.**

**Int. Cl.[3] B22F *00/00***

**U.S. Cl. 75—243** **8 Claims**



1. A diamond sintered body comprising 50–95 vol % of diamond below 1μ, the remainder being a bonding material comprising carbides, nitrides and borides of IVa, Va or VIa group metals of the periodic table, solid solutions or mixture crystals thereof below 1μ, and iron group metals.

7. A method for producing a diamond sintered body characterized in that a mixture of a diamond powder below 1μ and a powder below 1μ of one or more than two kinds of carbides, nitrides and borides of IVa, Va or VIa group metals of the periodic table and the solid solutions thereof, and a mixture in

which a powder of iron group metals is further added, or a mixture of alloy powders of the said compounds and the iron group metals preliminarily alloyed are produced, said mixture being interposed between a plurality of cemented carbide plates directly or with the interposition of partition members for precluding the displacement of a liquid phase in the course of sintering, the diamond containing mixture being sintered by hot pressing it under the condition of high temperature and high pressure in which diamond is stable, thereafter reducing temperature and removing pressure thus taking out sintered body, subsequently part or whole of the cemented carbide plates being removed substantially in parallel.

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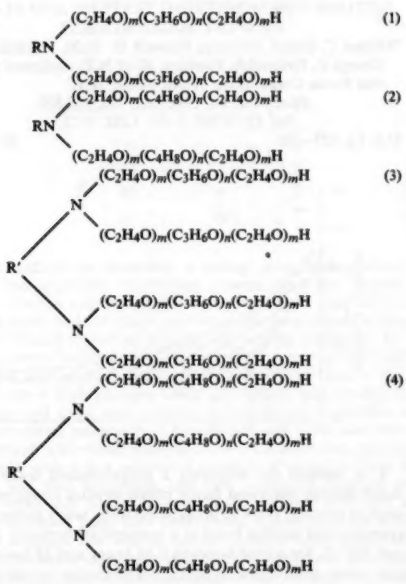
**4,303,443**

## ELECTROLESS COPPER PLATING SOLUTION

**Osamu Miyazawa, Yokosuka; Hitoshi Oka, Yokohama; Isamu Tanaka, Yokosuka; Akira Matsuo; Hitoshi Yokono, both of Yokohama; Nobuo Nakagawa, Yokohama, and Tokio Isogai, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 13, 1980, Ser. No. 159,231**
**Claims priority, application Japan, Jun. 15, 1979, 54-74615**
**Int. Cl.³ C23C *3/02***
**U.S. Cl. 106—1.23** **11 Claims**

**1.** In an electroless copper plating solution containing water, a water-soluble copper salt, a complexing agent for cupric ions, a reducing agent, a pH-controlling agent, and a stabilizer, the improvement wherein said plating solution contains at least one of the stabilizers represented by the following general formulae (1)–(4):



(1)

(2)

(3)

(4)

wherein m and n are integers of 1–100, R an alkyl group having 1 to 3 carbon atoms, and R' an alkylene group of $—CH_2—$, $—(CH_2)_2—$, or $—(CH_2)_3—$.

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**4,303,444**

## METHOD FOR INHIBITING BENZENE FORMATION IN ANTIFOULING PAINTS

**Michel Y. Warnez, Copenhagen, Denmark, assignor to M&T Chemicals Inc., Woodbridge, N.J.**

**Filed May 9, 1980, Ser. No. 148,126**
**Claims priority, application Denmark, May 10, 1979, 1957/79**
**Int. Cl.³ C09D *5/14***
**U.S. Cl. 106—16** **7 Claims**

**1.** A method for inhibiting the formation of benzene in an antifouling paint composition comprising gum rosin and a triphenyltin compound comprising the step of adding to the composition a basic trialkyltin oxide or hydroxide in at least 75% of the stoichiometric amount relative to the carboxylic acid groups in said rosin.

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**4,303,445**

## INK JET PRINTING FORMULATIONS

**Richard G. Whitfield, Brookfield, and Theodore M. Cooke, Danbury, both of Conn., assignors to Exxon Research & Engineering Co., Florham Park, N.J.**

**Filed Jul. 18, 1980, Ser. No. 169,977**
**Int. Cl.³ C09D *11/02***
**U.S. Cl. 106—22** **12 Claims**

**1.** A fluid composition which has a substantially constant surface tension and which is hygroscopically stable such that it is suitable for use as an ink in ink jet systems comprising a substantially non-aqueous printing medium having at least one borate ester miscible with said printing medium and derived from an aqueously miscible organic hydroxyl-containing compound.

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**4,303,446**

## FIBERIZABLE GLASS

**William C. LaCourse, Alfred, and Terence J. Clark, Alfred Station, both of N.Y., assignors to Borg-Warner Corporation, Chicago, Ill.**

**Filed Sep. 8, 1980, Ser. No. 185,074**
**Int. Cl.³ C03C *13/00, 3/04, 3/08***
**U.S. Cl. 501—35** **3 Claims**

**1.** A fibrous, lead-free glass having low hardness properties consisting essentially, on a weight basis, of from about 45% to about 75% of silicon dioxide, from about 15% to about 30% of potassium oxide and from about 2% to about 10% of magnesium oxide.

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**4,303,447**

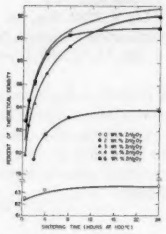
## LOW TEMPERATURE DENSIFICATION OF ZIRCONIA CERAMICS

**Relva C. Buchanan; H. Dale DeFord, both of Champaign, and Anup Sircar, Urbana, all of Ill., assignors to University of Illinois Foundation, Urbana, Ill.**

**Filed Apr. 2, 1980, Ser. No. 136,742**
**Int. Cl.³ C04B *35/48***
**U.S. Cl. 501—103** **11 Claims**

**1.** A fired ceramic composition having a density greater than about 98% of theoretical density which composition consists essentially of a major amount of zirconia and from about 1.0 to about 15% by weight of a boric oxide densification promoter wherein the boric oxide promoter is selected from the group consisting of calcium metaborate, calcium tetraborate, and $B_2O_3$; and wherein the zirconia component consists essentially of from about 5 to about 30% by weight of zirconia in the monoclinic crystal configuration, and from about 95 to about

70% by weight of zirconia stabilized in the cubic crystal configuration with from about 5 to about 15% by weight of an



oxide selected from the group consisting of CaO, MgO, and $Y_2O_3$.

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**4,303,448**

## OLIVINE REFRACTORY BRICKS FOR HEAT STORAGE APPLICATIONS

**Hayne Palmour, III; Billy M. Gay, and Ronald L. Cochrane, all of Raleigh, N.C., assignors to North Carolina State University, Raleigh, N.C.**

**Filed May 28, 1980, Ser. No. 153,859**
**Int. Cl.³ C04B *35/16***
**U.S. Cl. 501—127** **22 Claims**

**1.** An olivine refractory brick having thermal and physical properties suitable for use as a thermal energy storage unit in an electric thermal storage furnace and having excellent thermal shock properties and resistance to spalling, said brick consisting essentially of densely compacted grains of olivine and a plastic refractory kaoline binder effecting a sintered, liquid assisted but substantially solid state grain-to-grain bonding of the olivine, and said refractory brick exhibiting microcracking extending through the olivine grains.

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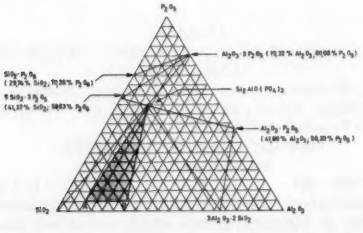
**4,303,449**

## GLASS FORMING COMPOUND AND BRICK MADE THEREWITH

**Peter Bartha, Bovenden, and Alexander Tutsek, Goettingen, both of Fed. Rep. of Germany, assignors to Refratechnik GmbH, Goettingen, Fed. Rep. of Germany**

**Division of Ser. No. 910,751, May 30, 1978, Pat. No. 4,213,789. This application Feb. 15, 1980, Ser. No. 121,820**
**Claims priority, application Fed. Rep. of Germany, Dec. 6, 1977, 2754190**
**Int. Cl.³ C04B *35/10, 35/14***
**U.S. Cl. 501—128** **5 Claims**



**1.** A grain mixture for producing refractory thermally insulating bricks, adapted for the preheating zone of a rotary cement kiln operating in an atmosphere containing KCl, characterized in that the fine portion thereof has a grain size of not greater than about 0.09 mm and consists of at least about 10 percent by weight of a grain mixture, the individual components of which lie within a region defined by a triangle A-B-C with the following boundary compositions: A = 10.5 percent by weight of $Al_2O_3$, 84.5 percent by weight of $SiO_2$, 5 percent by weight of $P_2O_5$; B = 28.6 percent by weight of $Al_2O_3$, 66.4 percent by weight of $SiO_2$, 5 percent by weight of $P_2O_5$; C = 14.00 percent by weight of $Al_2O_3$, 32.93 percent by weight of $SiO_2$, 53.02 percent by weight of $P_2O_5$ (corresponding to $Si_2AlO(PO_4)_3$), and in the remaining portion of fire clay and bonding clay; and that the medium and coarse grain portions thereof each consist of composition of the $SiO_2$-$Al_2O_3$ system and said medium and said coarse grain portions have an $Al_2O_3$ content which ranges from about 10 to 30 weight percent.

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**4,303,450**

## SPRAYABLE INSULATION COMPOSITION

**Dennis J. Hacker, Albuquerque, N. Mex., assignor to High Efficiency Insulation Technologies, Inc., Albuquerque, N. Mex.**

**Filed May 21, 1980, Ser. No. 151,799**
**Int. Cl.³ C04B *21/00***
**U.S. Cl. 106—88** **10 Claims**

**1.** A sprayable insulating composition completely curable within 36 hours at ambient conditions consisting essentially of:

(a) a dry mix of 100–120 parts by volume of expanded perlite, 20–30 parts by volume of Portland cement, 0.5–2.0 parts by volume of hydrated lime and 0.1–1.0 part by volume diatomite admixed with

(b) an aqueous solution of 0.25–2 ounces per gallon of water-soluble foaming agent at a level of 20–26 pounds of dry mix per Imperial gallon of solution.

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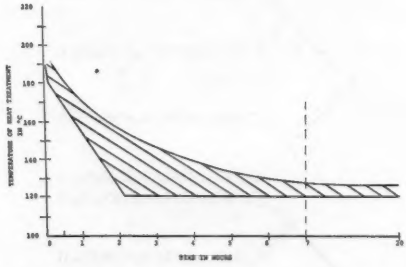
**4,303,451**

## METHOD FOR MODIFYING TEXTURE AND FLAVOR OF WAXY MAIZE STARCH

**William C. Seidel, Monsey; Howard D. Stahl, Hartsdale, and George E. Orozovich, Flushing, all of N.Y., assignors to General Foods Corporation, White Plains, N.Y.**

**Filed Mar. 31, 1980, Ser. No. 135,578**
**Int. Cl.³ C13L *1/08;* A23L *1/187***
**U.S. Cl. 127—32** **10 Claims**



**1.** A method for preparing a pregelatinized waxy maize starch having improved flavor characteristics comprising the steps of heating, prior to pregelatinization, waxy maize starch granules, said heating being at a temperature between 120° C. and 200° C. for a time between 0.10 hours and 24 hours, said time being insufficient to effect dextrinization of the heated starch but effective to prevent the formation of woody off-flavors during subsequent pregelatinization and storage of the starch granules, and thereafter, pregelatinizing the starch granules.

4,303,452

## METHOD OF PRODUCING IMPROVED STARCH BY SMOKING

Toshiaki Ohira, Sagamihara; Reiko Miyano, Kawasaki, and Ryonosuke Yoshida, Kamakura, all of Japan, assignors to Ajinomoto Company Incorporated, Tokyo, Japan

Filed Apr. 10, 1980, Ser. No. 138,894

Claims priority, application Japan, Apr. 16, 1979, 54-45270; Aug. 6, 1979, 54-10006; Jan. 16, 1980, 55-3377

Int. Cl.[3] C13L *1/08*

U.S. Cl. 127—32 6 Claims

1. A method of producing a smoked starch, which comprises:

a. preparing a starch having a water content of not greater than 50%, and a pH in the range of from 9 to 11; and

b. subjecting said starch to a smoking treatment.

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4,303,453

## METHOD AND APPARATUS FOR REMOVING SAND FROM CASTINGS

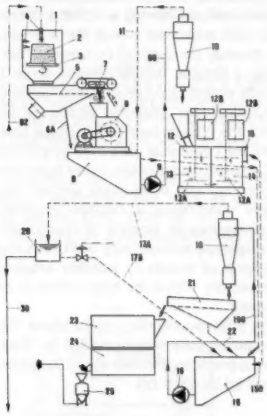
Werner Jung, Zurich, and Jack Oswald, St. Gallen, both of Switzerland, assignors to Foundry Design Corp., St. Gallen, Switzerland

Filed Mar. 3, 1980, Ser. No. 126,599

Claims priority, application Switzerland, Jun. 6, 1979, 5259/79

Int. Cl.[3] B08B *3/02, 7/04*

U.S. Cl. 134—10 12 Claims



1. A method for desanding a casting using high pressure water and separately recovering cleaned sand and cleaned water, wherein said casting has been prepared by sand casting using a mold made of quartz sand or zircon sand coated with a binder of resin or sodium silicate, said casting containing adhering thereto mold sand residues consisting essentially of said sand and said binder, which comprises the steps of: directing one or more high pressure water jets against said casting to dislodge said mold sand residues therefrom and separating a pulp consisting essentially of particles of said mold sand residues mixed with water; then, in a first separation step, mixing said pulp with a first additional quantity of water to form a slurry and then separating said first additional quantity of water from said slurry in a first hydrocyclone to obtain a hydro-extracted pulp; then feeding said hydro-extracted pulp into a scrubber and therein subjecting said hydro-extracted pulp to intensive turbulence and thereby rubbing said particles against one another so that said binder flakes off from the sand grains, and removing from the scrubber a mixture of said sand grains, binder flakes and water; then, in a second separation step, mixing said mixture with a second additional quantity of water and then separating a first fraction containing a major quantity of the water and the binder flakes from a second fraction containing a minor quantity of water and said sand grains in a second hydrocyclone; then removing water in the second fraction from said sand grains and then drying and cooling said sand grains to recover cleaned sand; neutralizing said first fraction by contacting same with gas containing $CO_2$; then adding and mixing a flocculation agent with said first fraction to flocculate the solids contained in said first fraction; separating the flocculated solids from the water and thereby recovering cleaned water from the first fraction.

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4,303,454

## VAPOR STRIPPING PROCESS

Robert C. Petterson, 7800 Cohn St., New Orleans, La. 70018, and Roger C. Loubier, 1000 Milton St., Gretna, La. 70053

Continuation-in-part of Ser. No. 870,103, Jan. 17, 1978, Pat. No. 4,231,804, and Ser. No. 1,053, Jan. 4, 1979, Pat. No. 4,231,805.

This application Jul. 3, 1980, Ser. No. 165,566

The portion of the term of this patent subsequent to Nov. 4, 1997, has been disclaimed.

Int. Cl.[3] B08B *5/00*

U.S. Cl. 134—11 13 Claims

1. In a process of stripping a protective or residual coating from a surface, wherein a gaseous stream of an organic stripping composition normally liquid at ambient temperature and pressure is circulated into contact with the coated surface and wherein neither the coated surface nor the gaseous stream of organic stripping composition is substantially above ambient temperature, the improvement comprising

substantially sealing said coated surface from the atmosphere to form a stripping zone,

forming a gaseous stream of a stripping composition in an evaporation zone containing a body of liquid stripping composition having a vapor pressure of at least 0.2 torr at ambient temperature and pressure, said evaporation zone being connected directly to said stripping zone so as to provide a substantially closed system,

introducing said stream of gaseous stripping composition into said stripping zone into contact with said coated surface and

recirculating the gaseous mixture from said stripping zone to said evaporation zone and then back to said stripping zone to rapidly increase the concentration of said stripping composition in said stripping zone but wherein the gaseous pressure in said stripping zone is not increased above about 200 torr.

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4,303,455

## LOW TEMPERATURE MICROWAVE ANNEALING OF SEMICONDUCTOR DEVICES

Michael R. Splinter, Silverado; Richard F. Palys, and Moiz M. Beguwala, both of Placentia, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

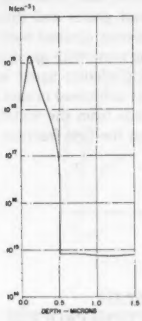
Filed Mar. 14, 1980, Ser. No. 130,509

Int. Cl.[3] H01L *21/263;* H05B *9/03*

U.S. Cl. 148—1.5 5 Claims

1. A process for fabricating a semiconductor device, the device comprising a semiconductor substrate having a major surface including an ion implanted region, characterized in that

one fabrication step in the process subsequent to the formation of the ion implanted regions is to direct a beam of microwave



radiation at said entire device for annealing the ion implanted regions.

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**4,303,456**

## PROCESS FOR THE CONTINUOUS PRODUCTION OF WET FOAM LAMINATED FABRICS

**Günter Schmuck, Greenville, S.C., and Dieter Wegehaupt, Rheinfelden, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed May 15, 1980, Ser. No. 150,035**

**Claims priority, application Switzerland, May 23, 1979, 4840/79**

**Int. Cl.³ B32B *31/20, 5/18;* C08L *67/08***

**U.S. Cl. 156—78** **10 Claims**

1. A process for the continuous production of laminated elastic fabrics having good permeability to air and/or water vapour, which process comprises coating a first web of fabric in the tensionless state with a foamed aqueous preparation which contains

($a_1$) a self-crosslinking acrylate-based copolymer,
($a_2$) a self-crosslinking vinyl-acrylate copolymer or
($a_3$) a self-crosslinking olefin-vinyl copolymer,
(b) optionally a curable, crosslinking, polyfunctional aminoplast precondensate or aminoplast former,
(c) a surface-active foaming agent,
(d) a stabiliser,
(e) optionally a wetting agent,
(f) optionally a thickener, and
(g) an amine or alkanolamine containing 1 to 4 carbon atoms or ammonia,

bonding a second web of fabric, optionally under low tension, to the coated side of the first web, then drying and optionally pressing both webs together and finally subjecting them to a thermosetting treatment.

**4,303,457**

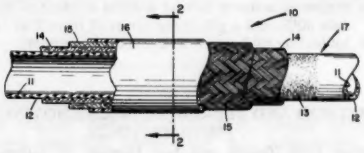
## METHOD OF MAKING A SEMI-CONDUCTIVE PAINT HOSE

**Hans A. Johansen; Larry R. Phillippi, and Edward A. Green, all of Mantua, Ohio, assignors to Eaton Corporation, Cleveland, Ohio**

**Division of Ser. No. 620,189, Oct. 6, 1975, abandoned, which is a continuation-in-part of Ser. No. 598,537, Jul. 23, 1975, abandoned, and a continuation-in-part of Ser. No. 469,611, May 13, 1974, abandoned. This application Jun. 18, 1979, Ser. No. 49,689**

**Int. Cl.³ B29D *23/05***

**U.S. Cl. 156—149** **11 Claims**




1. A method of making a flexible electrically conductive hose for the conveyance of fluids under pressure comprising a flexible composite core tube, a fibrous reinforcing material disposed about the core tube and a protective sheath disposed about the fibrous reinforcing material, said hose having improved resistance to rupture from pulsating fluids as a result of said core tube utilizing a flexible electrically conductive synthetic polymeric material having a volume resistivity adapted to provide the sole means by which the hose conducts static electricity to ground; the method comprising the steps of:

(a) extruding a flexible tubular shaped inner layer from a substantially nonconductive synthetic polymeric material having physical and chemical resistance characteristics suitable for the conveyance of the fluids therethrough;
(b) providing the composite core tube by extruding a tubular shaped electrically conductive outer layer about the inner layer of step (a) and in intimate contact therewith, said outer layer comprising a flexible synthetic polymeric material containing an amount of electrically conductive particles dispersed substantially uniformly therein to provide a volume of resistivity suitably adapted to provide the sole means by which the hose conducts static electricity to ground;
(c) providing a fibrous reinforcement about the outer layer of the composite core tube provided by Step (b); and
(d) providing a protective sheath about the fibrous reinforcement provided by Step (c).

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**4,303,458**

## METHOD OF JOINING CONDUITS WITH A CONNECTING PIECE AND CONNECTING PIECE FOR USE IN THE METHOD

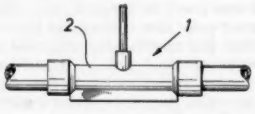
**Kaj O. Stenberg, Staffanstorp, Sweden, assignor to Gambro AB, Sweden**

**PCT No. PCT/SE78/00002, § 371 Date Feb. 19, 1980, § 102(e) Date May 21, 1979, PCT Pub. No. WO80/00067, PCT Pub. Date Jan. 24, 1980**

**PCT Filed Jun. 19, 1978, Ser. No. 190,319**

**Int. Cl.³ B29C *27/02;* F16L *47/02***

**U.S. Cl. 156—158** **20 Claims**




1. A method of joining two or more conduits by employing

a one-piece tubular connecting member, said connecting member including at least two conduit-receiving openings and a separate sealable opening which includes flaps, comprising the steps of:

locating one end of each conduit at respective ones of said conduit-receiving openings in said connecting member;

inserting support means through said separate sealable opening in said connecting member to support at least one conduit end at a respective conduit-receiving opening;

securing said at least one conduit end to said connecting member while said at least one conduit end is being supported by said support means;

withdrawing said support means from said sealable opening; and

sealing said sealable opening by sealing said flaps to each other.

**11**. A one-piece tubular connecting member for joining two or more conduits, comprising:

said connecting member including at least two conduit-receiving openings, each for receiving one end of a conduit;

said connecting member including a separate sealable opening for receiving support means for supporting at least one conduit end at a respective conduit-receiving opening while said at least one conduit end is being secured to said connecting member and for permitting withdrawal of said support means; and

said sealable opening including means for sealing the sides thereof together after the withdrawal of said support means,

said means for sealing including flaps formed integrally with said connecting member for sealing the opening.

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**4,303,459**

## METHOD OF MAKING TEXTURED PATTERNS ON ORIGINALLY SMOOTH WEBS OF FABRICS, AND METHOD OF PARTIALLY PRINTING THE SAME

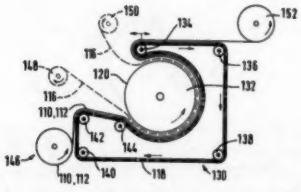
**Kurt Kleber, Zum Mühlgraben 4, 6842 Bürstadt, Fed. Rep. of Germany**

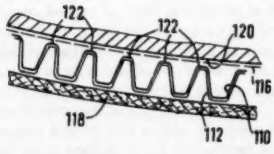
**Filed Nov. 28, 1979, Ser. No. 98,058**

**Claims priority, application Fed. Rep. of Germany, Dec. 4, 1978, 2852346; Jul. 16, 1979, 2928658**

**Int. Cl.**[3] **B29B** *31/00, 1/00;* **D05B** *35/08;* **D06J** *1/00*

**U.S. Cl. 156—227** **6 Claims**




**1**. A method of making textured patterns on an originally smooth web of fabric, comprising: covering the smooth web of fabric with an upper and lower web of paper subjecting the webs to such a mechanical pleating treatment so as to obtain fixed upright pleats regularly or irregularly distributed over the web of fabric, winding up completed webs in a roll, continuously heating the thus mechanically pleated web of fabric, removing the upper web of paper and withdrawing the web of fabric with the upright pleats and lower web of paper from the roll, deforming the previously permanently fixed pleated pleats, placing a web of thermal printing paper on the free upper side of the web of fabric, compressing the webs such that the upright pleats of the web of fabric are partially compressed and engage with the web of thermal printing paper, applying heat to the rear side of the web of thermal printing paper which is facing away from the web of fabric, thus transferring ink and/or a pattern of the thermal printing paper to the adjacent areas of the web of fabric and finally fixing the deformation of the pleats by cooling the web of fabric.

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**4,303,460**

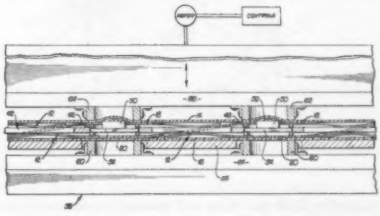
## METHOD OF MAKING BAFFLED LAP WELDED WATERBED MATTRESS BAG

**Alberto L. Finkelstein, Newbury Park, Calif., assignor to Mollura Industries, City of Industry, Calif.**

**Division of Ser. No. 53,398, Jun. 29, 1979, which is a continuation of Ser. No. 2,024, Jan. 9, 1979, abandoned. This application May 6, 1980, Ser. No. 147,234**

**Int. Cl.**[3] **B29C** *19/04*

**U.S. Cl. 156—273** **4 Claims**



**1**. A method of making a waveless waterbed bag which comprises:

(a) forming a tube by partially lap welding the ends of sheet material together, leaving an intermediate access slit;

(b) lap welding generally rectangular end pieces at opposite openings of the tube;

(c) threading a jig through a plurality of two-layer hollow baffle elements, with each baffle element encompassing one of a series of floating die elements attached to the jig;

(d) extending the jig and baffle elements thereon into the bag through said access slit;

(e) aligning the floating die elements of the jig with die members of a welding machine;

(f) closing the welding machine die members on the jig;

(g) generating dielectric heat to weld the baffle elements to the top and bottom layers of the bag;

(h) withdrawing the jig from the bag and the welded baffle elements; and

(i) thereafter completing the lap welding of the tube.

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**4,303,461**

## LABELLING SYSTEM

**Herbert La Mers, Oxnard, Calif., assignor to Gar Doc, Incorporated, Milford, N.H.**

**Continuation-in-part of Ser. No. 866,455, Jan. 3, 1978, Pat. No. 4,217,164, which is a continuation of Ser. No. 618,690, Oct. 1, 1975, abandoned. This application Apr. 8, 1980, Ser. No. 138,586**

**The portion of the term of this patent subsequent to Aug. 12, 1997, has been disclaimed.**

**Int. Cl.**[3] **B65C** *9/18*

**U.S. Cl. 156—361** **18 Claims**

**1**. Apparatus for automatically sequentially applying labels to objects, said apparatus comprising:

a label strip having index marks therealong separated from

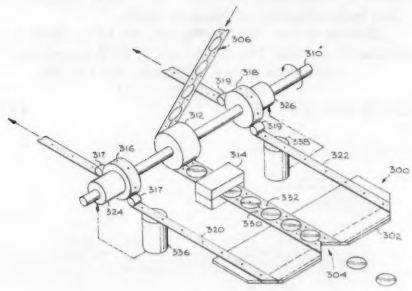
one another by a unit spacing, said label strip including first and second parallel carrier strip portions and a plurality of labels adhered along said strip so as to bridge said carrier strip portions, each label being uniformly positioned with respect to one of said index marks;

a plate having first and second opposing surfaces and an edge

including a label separation region extending into said plate comprised of first and second edge portions having non-aligned axes;

strip transport means for moving said label strip along a first path extending substantially contiguous with said first surface toward said label separation region and then along first and second branch paths respectively extending around said first and second edge portions and thence along said second surface;

said strip transport means including (1) first means positioned down-path from said first and second edge portions




engaging both said first and second carrier strip portions for pulling them along said first and second branch paths at a substantially first linear rate and (2) second means positioned up-path from said label separation region in engagement with said carrier strip portions tending to reduce their rate of movement to less than said first linear rate thus creating tension in said carrier strip portions and (3) means associated with said first and/or second means and operatively coupled to said index marks for moving said first and second carrier strip portions by identical multiples of said unit spacing to thus prevent any cumulative differential linear movement between said carrier strip portions; and

label-applying means operable to engage labels immediately adjacent to said label separation region as said carrier strip portions are simultaneously separated from each other and from said labels and to press said engaged labels against objects to be labeled.

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**4,303,462**

## ROLL WRAPPER HEADER APPARATUS

**Gerald W. Karr, South Beloit, Ill., assignor to Beloit Corporation, Beloit, Wis.**

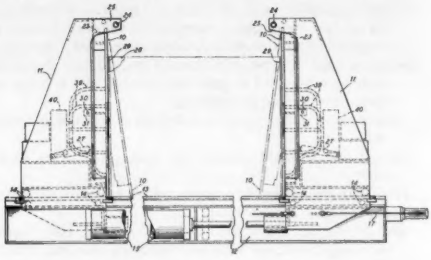
**Filed Nov. 9, 1979, Ser. No. 92,735**
**Int. Cl.³ B32B *31/00***
**U.S. Cl. 156—538** **4 Claims**

1. In apparatus for applying outside heads in the form of paperboard disks to the ends of wrapped paper rolls, and wherein the apparatus has opposed spaced head-applying platens each of which has a head disk carrying and pressure face, the improvement comprising:

each of said platens having a respective recess in its pressure face for accommodating protuding roll core ends in a manner to avoid interference of such protruding core ends with efficient, uniform application of said heads to the ends of the wrapped paper rolls;

and an air suction system in each of said faces for holding the heads on the platens until the heads have been applied to the roll ends;

said system comprising an array of grooves in each of said faces and which grooves dead end adjacently spaced from the recess and extend in generally radiating pattern



toward the perimeters of said faces, and suction ports leading from said grooves adjacent to their dead ends and connected to a suction device;

said suction device having respective ducts leading from said suction ports.

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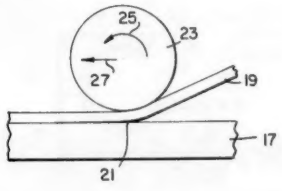
**4,303,463**

## METHOD OF PEELING THIN FILMS USING DIRECTIONAL HEAT FLOW

**Melvin S. Cook, 43 Westerly Rd., Saddle River, N.J. 07458**

**Filed Sep. 29, 1980, Ser. No. 192,063**
**Int. Cl.³ C30B *1/06***
**U.S. Cl. 156—603** **3 Claims**




1. A method of producing films of crystal comprising the steps of epitaxially growing a solid layer of crystal on a solid substrate, the material adjoining the interface of said layer of crystal and said substrate of one of said layer of crystal and said substrate having a melting point temperature lower than that of the material adjoining said interface of the other of said layer of crystal and said substrate, adding heat to said material adjoining said interface having said lower melting point temperature by contacting said other of said layer of crystal and said substrate to a heat source such that material adjoining said interface having said lower melting point temperature liquifies, the remaining material having said lower melting point temperature remaining in solid form, and separating said layer of crystal from said substrate at said liquified material to form a film of crystal.

4,303,464

## METHOD OF MANUFACTURING GALLIUM PHOSPHIDE SINGLE CRYSTALS WITH LOW DEFECT DENSITY

Takashi Suzuki, Nishinomiya; Shin-ichi Akai, Osaka; Hideki Mori, Sakai; Katsunosuke Aoyagi, Suita; Takashi Shimoda, Osaka; Kazuhisa Matsumoto, Ibaraki, and Masami Sasaki, Takarazuka, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Division of Ser. No. 949,079, Oct. 6, 1978, abandoned. This application Mar. 14, 1980, Ser. No. 130,407

Claims priority, application Japan, Oct. 17, 1977, 52-124839

Int. Cl.[3] C30B *15/04*

U.S. Cl. 156—605 4 Claims

1. A method of manufacturing gallium phosphide single crystals with low defect density, which have a sum of dislocation etch pit density and small conical etch pit density that does not exceed $1\times10^5$ cm$^{-2}$ on the (111)B surface of said crystals after removal of mechanically damaged surface layer and subjection to etching with RC etchant for 3~5 minutes at a temperature of 65° C.~75° C., by the liquid encapsulation Czochralski pulling method using a liquid encapsulant and which is characterized by controlling the Czochralski method in the steps of

selecting a temperature gradient in the liquid encapsulant ($B_2O_3$) which is approximately 200° C./cm,

doping with at least one kind of strongly reducing impurity selected from a group of impurities which have reducing activity equal to or greater than that of boron under such conditions that oxygen concentration in the raw material gallium phosphide melt does not exceed 0.15 mol percents, and

thereby doping the pulled crystals with $1\times10^{17}$ cm$^{-3}$ or more of said strongly reducing impurity with good reproducibility.

4,303,465

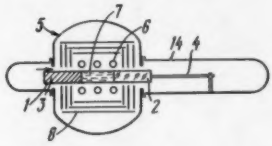
## METHOD OF GROWING MONOCRYSTALS OF CORUNDUM FROM A MELT

Khachik S. Bagdasarov, ulitsa Garibaldi, 19, korpus 2, kv. 42; Valentin Y. Khaimov-Malkov, Jugo-Zapad, kvartal 42-a,5, kv. 57; Nikolai P. Ilin, ulitsa Vavilova, 39, kv. 7, all of Moscow; Jury A. Starostin, Leninsky raion, p/o Kommunerka, poselok Gezoprovod, 1, kv. 4, Moskovskaya oblast; Evgeny A. Fedorov, ulitsa Garibaldi, 23/56, korpus 4, kv. 23, and Nikolai I. Sedakov, 1 Novokuznetsky pereulok, 11/13, kv. 14, both of Moscow, all of U.S.S.R.

Continuation of Ser. No. 732,419, Oct. 14, 1976, abandoned, which is a continuation of Ser. No. 600,214, Jul. 30, 1975, abandoned, which is a continuation of Ser. No. 459,796, Apr. 10, 1974, abandoned, which is a continuation of Ser. No. 296,820, Oct. 12, 1972, abandoned. This application Apr. 25, 1978, Ser. No. 899,831

Int. Cl.[3] C30B *11/02*

U.S. Cl. 156—616 R 16 Claims




1. A method of growing monocrystals of corundum from a melt comprising the steps of: charging alumina as a starting material into a substantially horizontal crucible within a shielding atmosphere, said crucible being made of a metal selected from group VI of the periodic table and having its melting point above 2300° C.; heating the alumina to its melting point using Joule heat; and growing the monocrystal by passing the crucible containing the melt through a horizontal crystallization zone across which is maintained a temperature gradient effective for crystallizing said melt.

4,303,466

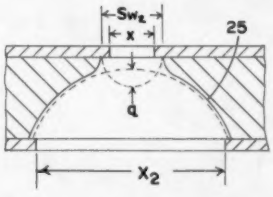
## PROCESS OF FORMING GRADED APERTURE MASKS

Roland Thoms, Mullheim, Fed. Rep. of Germany, assignor to Buckbee-Mears Company, St. Paul, Minn.

Filed Jun. 19, 1980, Ser. No. 161,062

Int. Cl.[3] C23F *1/02*; B23P *15/00, 25/06*

U.S. Cl. 156—626 8 Claims




1. The process of forming a plurality of openings in an aperture mask which vary in size from the center of the aperture mask to the periphery of the aperture mask comprising:

applying a layer of etchant resist to opposite surfaces of an aperture mask material, determining an over-etch factor for the aperture mask material by determining the depth of the etch from opposite surfaces of said aperture mask material;

laying out a pattern of openings in an etchant resist located on opposite surfaces of the aperture mask material wherein the size of the openings in etchant resist is determined by selecting a resist opening wherein the over-etch

factor is substantially constant for etching openings in the aperture mask material; and

etching the aperture mask material through the openings in the etchant resist.

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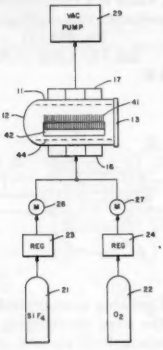
## 4,303,467
## PROCESS AND GAS FOR TREATMENT OF SEMICONDUCTOR DEVICES

**Frank Scornavacca, Emerson, N.J., and Richard L. Bersin, Castro Valley, Calif., assignors to Branson International Plasma Corporation, Hayward, Calif.**

**Filed Nov. 11, 1977, Ser. No. 850,713**

**Int. Cl.³ C23F *1/02*; H01L *21/306*; C03C *15/00, 25/06***

**U.S. Cl. 156—643** **17 Claims**




1. In a process for removing a material from a semiconductor device in a plasma reactor, the steps of: introducing $SiF_4$ and oxygen gas into the reactor chamber, energizing the $SiF_4$ and oxygen gas to form a plasma, and exposing the material to the plasma for a time sufficient to remove a predetermined amount of the material.

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## 4,303,468
## MECHANICAL VAPOR RECOMPRESSION EVAPORATORS

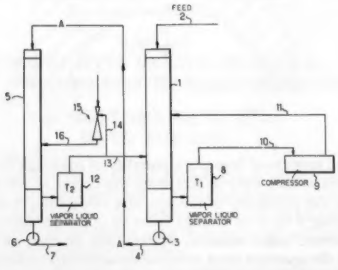
**Pierre R. Laguilharre, Enghien les Bains, and Jacques J. Ciboit, Paris, both of France, assignors to Laguilharre S.A., Nanterre, France**

**Filed Apr. 3, 1980, Ser. No. 136,978**

**Claims priority, application Luxembourg, Apr. 19, 1979, 81168**

**Int. Cl.³ B01D *1/26***

**U.S. Cl. 159—47 R** **6 Claims**




1. A process for providing make-up heat in a mechanical vapour recompression evaporator which comprises introducing the product to be concentrated into a first evaporator, introducing the concentrated product discharged from said evaporator to a second make-up evaporator, the vapour created as a result of the condensation process in said first evaporator being conveyed after processing to the heating unit of said first evaporator, the evaporation vapour created in said make-up evaporator being directed through a vapour-liquid separator to the heating unit of said first evaporator where it serves as make-up heat for the operating cycle of said first evaporator.

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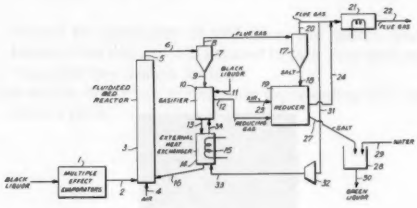
## 4,303,469
## PROCESS AND APPARATUS FOR RECOVERY OF SPENT PULPING LIQUORS

**Salvatore T. DiNovo, and Wayne E. Ballantyne, both of Columbus, Ohio, assignors to International Paper Company, New York, N.Y.**

**Filed Apr. 14, 1980, Ser. No. 139,657**

**Int. Cl.³ D21C *11/12***

**U.S. Cl. 162—30 R** **42 Claims**




1. An integrated process for the recovery of the energy and chemical values from spent pulping liquors, comprising an initial stage of subjecting concentrated spent pulping liquor to combustion with air in a fluidized bed reaction chamber provided with a plurality of solid particulate materials, at least one of which is of finer particle size than another, followed by separation of the finer particle size particulate material from the gaseous and solid combustion products outside of said initial fluidized bed reaction chamber, followed by at least one further step of treating the separated finer particle size particulate material in an external fluidized bed unit to remove heat values from the separated finer particle size particulate material and followed by return of the separated finer particle size particulate material to said initial fluidized bed reaction chamber.

2. An integrated process for the recovery of the energy and chemical values from spent pulping liquors, comprising an initial stage of subjecting concentrated spent pulping liquor to combustion with air in a fluidized bed reaction chamber provided with a plurality of solid particulate materials, at least one of which is of finer particle size than another, followed by separation of the finer particle size particulate material from the gaseous and solid combustion products outside of said initial fluidized bed reaction chamber, and followed by regeneration of the pulping chemicals of the spent pulping liquor from the solid combustion products and return of the separated finer particle size particulate material to said initial fluidized bed reaction chamber.

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## 4,303,470
## METHOD AND APPARATUS FOR MIXING GASES WITH A WOOD PULP SLURRY

**Michael D. Meredith, Federal Way; Jozef M. Bentvelzen, Sumner, both of Wash., and Henry Bepple, Kamloops, Canada, assignors to Weyerhaeuser Company, Tacoma, Wash.**

**Filed Jun. 15, 1979, Ser. No. 48,939**

**Int. Cl.³ D21C *9/10*; D21D *5/28***

**U.S. Cl. 162—57** **73 Claims**

1. The process of mixing a chemical selected from the group consisting of noncondensable gases, unsaturated gases and

highly superheated steam with a wood pulp having a consistency of 7 to 15%, comprising

passing said pulp through a mixing zone,

adding said chemical to said pulp in said mixing zone,

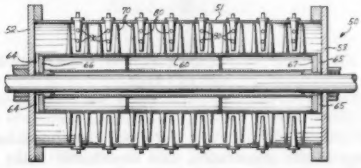
said mixing zone having a series of rotating members passing through said pulp in a direction transverse the direction of travel of said pulp,

said members having a major axis extending in the direction of rotation,

said members providing a swept area through said pulp of 10,000 to 1,000,000 square meters per metric ton of oven dry pulp,

said members having leading and trailing edges, said leading edge having a radius of curvature in the range of 0.5 to 15 mm.

49. A mixer for mixing a chemical selected from the group consisting of noncondensable gases, unsaturated gases and highly superheated steam with a slurry comprising



a casing,

an inlet at one end of said casing and an outlet at the opposite end of said casing,

a shaft in said casing,

said casing, said inlet and said outlet, and said shaft defining a mixing zone,

a plurality of rotors on said shaft in said mixing zone,

said rotors having leading and trailing edges, said leading edge having a radius of curvature in the range of 0.5 to 15 mm,

said rotors being rotatable through said slurry in a direction transverse to the direction of travel of said slurry,

said rotors having a major axis extending in the direction of rotation,

means for rotating said rotors, and

said rotors providing a swept area of 10,000 to 1,000,000 square meters per metric ton of oven dry solid material in said slurry.

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**4,303,471**

## METHOD OF PRODUCING FLUFFED PULP

**Bente L. Laursen, Ektorp, Sweden, assignor to Berol Kemi AB, Stenungsund, Sweden**

**Filed Jul. 20, 1979, Ser. No. 59,451**

**Claims priority, application Sweden, Jul. 21, 1978, 7808056**

**Int. Cl.³ D21H *3/08***

**U.S. Cl. 162—158** **10 Claims**

1. In the method that includes:

forming a liquid suspension of cellulose pulp, removing a substantial portion of the liquid to form an essentially dry mass of cellulose pulp, and

disintegrating the essentially dry mass of cellulose pulp into a fluff,

the improvement which comprises reducing the amount of energy required to disintegrate said mass into fluff which comprises including in said liquid suspension a mixture of

(a) a non-ionic compound in an amount sufficient to reduce the bonding forces between cellulose fibers, and

(b) at least one cationic retention agent,

said nonionic compound being a partial fatty acid ester of polyvalent alcohol having 2–8 carbon atoms, or an anhydride thereof, or a partial fatty acid ester of polyethylene glycol or polypropylene glycol having a molecular weight up to 500.

**4,303,472**

## FILTER ELEMENTS FOR GAS OR LIQUID AND METHODS OF MAKING SUCH FILTERS

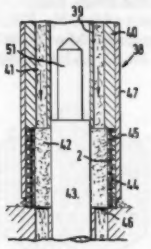
**Brian Walker, Washington, and Kenneth Merrie, High Shincliffe, both of England, assignors to Process Scientific Innovations Limited, Durham, England**

**Filed Jan. 15, 1979, Ser. No. 3,450**

**Claims priority, application United Kingdom, Jan. 23, 1978, 2559/78**

**Int. Cl.³ D21J *7/00***

**U.S. Cl. 162—221** **15 Claims**



1. A method of forming a tubular filter element comprising the steps of forming a slurry of fibers in a liquid, introducing said slurry into the top of an annular molding space defined between a central core, a vertical cylindrical screen spaced from and outward of said core, and an annular screen which extends between the bottom of said cylindrical screen and said core, applying positive pressure to the upper surface of said slurry while said slurry is being introduced into said molding space said pressure applied to the slurry being introduced into said molding space being effective to compact a mass of said fibers on said annular screen and to aid the discharge of said liquid from said molding space through said screens, progressively increasing the height of the effective open area of said cylindrical screen by moving upwardly a sleeve in sliding contact with said cylindrical screen at a rate substantially equal to the rate at which the height of said mass fibers increases above said annular screen, removing said mass from said molding space, and bonding said fibers together.

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**4,303,473**

## TORUS TYPE VACUUM SHELL

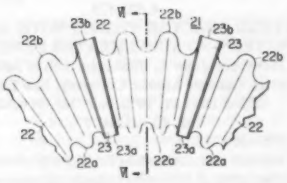
**Masato Nagao; Yoshiyasu Ito; Keizou Wase; Yoshiaki Kazawa, and Takamasa Fujinaga, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Division of Ser. No. 653,781, Jan. 30, 1976, abandoned. This application Apr. 3, 1978, Ser. No. 893,020**

**Claims priority, application Japan, Feb. 5, 1975, 50-14366**

**Int. Cl.³ G21B *1/00***

**U.S. Cl. 376—150** **11 Claims**



1. A torus vacuum shell whose interior may be maintained in a high vacuum state, and having at least a portion extending in a circumferential direction being constructed of a bellows having a wall corrugated in the peripheral direction and ex-

tending substantially completely around the toroidal direction to define a crest for each corrugation; toroidal electromagnetic coils and poloidal electromagnetic coils wound around said shell; the height of the crest of the bellows increasing from the inner periphery towards the outer periphery in a radial plane cross section; and the thickness of the bellows wall increasing from the inner periphery towards the outer periphery.

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**4,303,474**

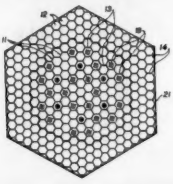
## NUCLEAR REACTOR CORE ASSEMBLY

**Chandrakant B. Baxi, Encinitas, Calif., assignor to General Atomic Company, San Diego, Calif.**

**Continuation-in-part of Ser. No. 773,141, Mar. 1, 1977, abandoned. This application May 17, 1978, Ser. No. 906,732**

**Int. Cl.³ G21C *15/00***

**U.S. Cl. 376—175** **6 Claims**



**1.** In a nuclear reactor having a core assembly and a fluid coolant which is circulated at a first flow rate during operation and a second flow rate during shutdown, said first flow rate being substantially higher than said second flow rate, a plurality of fuel elements and a plurality of blanket elements arranged in the core assembly, said fuel elements including first conduit means for directing fluid coolant therethrough, said blanket elements having second conduit means for directing fluid coolant therethrough, said second conduit means having flow restrictor means therein, the improvement wherein said flow restrictor means comprise a plurality of surface roughened elements for limiting flow therethrough, said elements being arranged in a predetermined pitch and having an initial predetermined surface roughness and having a predetermined size, said flow restrictor means having a static configuration wherein the number, pitch, size and roughness of said elements are selected to initially provide a relative roughness of at least about 0.05 and a Reynolds number ($N_{Re}$) at said second flow rate which is less than and immediately adjacent the Reynolds criterion ($N_{Re}C$), and the Reynolds number at said first flow rate being greater than the Reynolds criterion, whereby the friction factor is substantially lower in said second conduit means at shutdown than at full power operation, whereby at the second flow rate, the percentage of the total coolant flow which flows through said second conduit means is substantially greater than the percentage of the total coolant flow which flows through said second conduit means at said first flow rate.

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**4,303,475**

## NUCLEAR REACTOR SYSTEM WITH ALIGNED FEEDWATER AND SUPERHEATER PENETRATIONS

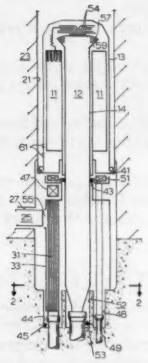
**Edwin J. Hurn, and John A. Kissinger, both of San Diego, Calif., assignors to General Atomic Company, San Diego, Calif.**

**Filed Dec. 11, 1978, Ser. No. 968,345**

**Int. Cl.³ G21C *17/28***

**U.S. Cl. 376—394** **6 Claims**

**1.** In a nuclear reactor system having a prestressed concrete reactor vessel with at least one cylindrical cavity therein for a steam generator including a feedwater tubesheet and a superheater tubesheet, the improvement comprising at least two feedwater penetrations in said reactor vessel communicating between the exterior of said reactor vessel and said cylindrical cavity, said feedwater penetrations having mutually parallel axes parallel to an extension of the axis of said cylindrical cavity, feedwater inlet means in said feedwater penetrations, a superheater penetration communicating between the exterior of said reactor vessel and said cylindrical cavity, said superheater penetration having an axis parallel to the axes of said feedwater penetrations and being substantially aligned with the



axis of said cylindrical cavity, and superheater outlet means in said superheater penetration, said superheater outlet means including a tubesheet positioned in said superheater penetration a substantial distance from both said cylindrical cavity and the exterior of said reactor vessel.

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**4,303,476**

## DISMOUNTABLE FUEL ASSEMBLY FOR NUCLEAR REACTOR

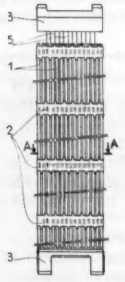
**Joseph Leclercq, Le Vesinet, France, assignor to Societe Franco-Americaine de Construction Atomiques-Framtome, Courbevoie, France**

**Continuation of Ser. No. 840,371, Oct. 7, 1977, abandoned. This application Dec. 4, 1979, Ser. No. 100,216**

**Claims priority, application France, Oct. 20, 1976, 76 31554**

**Int. Cl.³ G21C *3/34***

**U.S. Cl. 376—446** **9 Claims**



**1.** An easily dismountable fuel assembly for a nuclear reactor, said assembly comprising:

a bundle of parallel fuel slugs;

a plurality of cross pieces extending transversely to said slugs and holding said slugs spaced apart;

a plurality of assembly bearing tubes taking the place of some slugs and longer than said slugs;

end plates arranged at each end of said bundle of slugs; and

means for securing each of said tubes to each of said end plates; said securing means for securing said tubes to at least one of said end plates comprising, in respect of each tube a cylindrical sleeve substantially entirely enclosed in

an aperture in said one end plate, said aperture being coaxial with said respective tube and said sleeve extending through said plate and abutting said plate by a shoulder provided on said sleeve, connection means on said sleeve for engagement with corresponding connection means on the respective end of said tube by relative rotation of said sleeve and tube, said sleeve having means for engagement by a tool for rotating said sleeve about its axis in one direction for connecting said sleeve to said tube and clamping said tube to said end plate in an axial direction, and for rotating said sleeve in the opposite direction for disconnecting said sleeve from said tube, said end of said tube comprising an expanded portion having a prismatic outer surface for engagement in a correspondingly shaped first recess in said end plate to prevent relative rotation between said tube and said plate, said sleeve having a deformable portion deformable into a second reces in said end plate for preventing rotation of said sleeve relative to said end plate.

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## 4,303,477
## PROCESS FOR THE PYROLYSIS OF WASTE MATERIALS

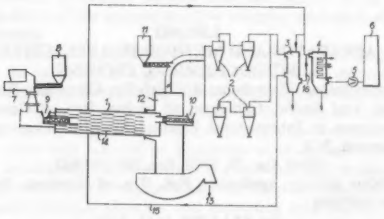
**Rudiger Schmidt, and Franz Steininger, both of Munich, Fed. Rep. of Germany, assignors to Babcock Krauss-Maffei Industrieanlagen GmbH, Munich, Fed. Rep. of Germany**

**Filed Jun. 9, 1980, Ser. No. 157,260**

**Claims priority, application Fed. Rep. of Germany, Jun. 25, 1979, 2925620; Dec. 20, 1979, 2951478**

**Int. Cl.³ C10B** *47/30, 57/06, 57/14, 57/18*

**U.S. Cl. 201—2.5** **16 Claims**



**1.** A method of suppressing the emission of halogens and sulfur dioxide and the formation of water-soluble compounds of heavy metals in the pyrolysis of carbonaceous waste in an indirectly heated revolving tubular furnace at temperatures in the range from 300° to 600° C. to form low-temperature coke, wherein the improvement comprises the steps of (a) adding a first quantity of a fine-grained basic material to the waste prior to completion of the pyrolysis of the waste in the revolving tubular furnace, (b) mixing the pyrolysis gases leaving the revolving tubular furnace with a second quantity of fine-grained basic material, and (c) passing the gases through a dust extractor, whereby a dense, compact low-temperature coke having reduced dust content is produced.

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## 4,303,478
## PROCESS FOR DISTILLATIVELY SEPARATING LIQUID MIXTURES

**Edwin L. Field, Lexington, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.**

**Filed Aug. 28, 1980, Ser. No. 182,116**

**Int. Cl.³ B01D** *3/16*

**U.S. Cl. 203—19** **18 Claims**

**10.** A process for recovering ethyl alcohol from a dilute aqueous mixture containing noncondensable components, comprising the steps of

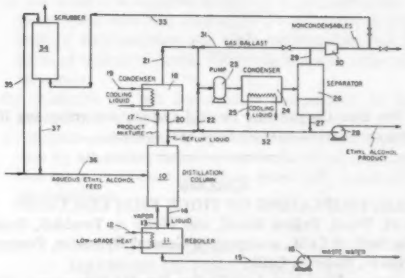
(a) supplying to a distillation column a source of low-grade heat between about 30° C. and about 80° C.;

(b) supplying a cooling liquid having a temperature up to about 75° C.;

(c) distilling a dilute aqueous mixture of ethyl alcohol and noncondensables in said distillation column, to form an ethyl alcohol product mixture and an aqueous waste mixture, under a pressure sufficiently below atmospheric to cause said aqueous waste mixture to boil below the temperature of said low-grade heat supplied to said distillation column;

(d) discharging said aqueous waste mixture from the bottom of said distillation column;

(e) withdrawing from said distillation column said ethyl alcohol product mixture containing said noncondensables at a pressure essentially equivalent to that prevailing near the top of said distillation column;




(f) elevating the pressure of said withdrawn ethyl alcohol product mixture to a level which is no greater than that which effects the condensing of said ethyl alcohol above the temperature of said cooling liquid supplied, to form ethyl alcohol product and gaseous noncondensables;

(g) separating said liquid ethyl alcohol product and said noncondensables;

(h) throttling a portion of said ethyl alcohol product mixture to provide a low-temperature liquid ethyl alcohol at a pressure essentially equal to that prevailing near the top of said distillation column; and

(i) returning at least a portion of said low-temperature liquid ethyl alcohol from step (h) to the top of said distillation column as reflux liquid.

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## 4,303,479
## DISTILLATION SEPARATION METHOD

**Shirley L. Church, E. Amherst, and Loren M. Hilts, Niagara Falls, both of N.Y., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

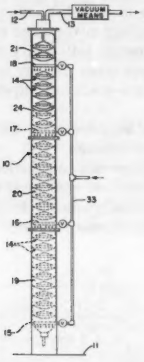
**Division of Ser. No. 840,343, Oct. 7, 1977, Pat. No. 4,201,628. This application Dec. 3, 1979, Ser. No. 99,306**

**Int. Cl.³ B01D** *3/38;* **C08F** *6/04*

**U.S. Cl. 203—89** **6 Claims**

**1.** A method of removing a low boiling component from a multiple component mixture in a system comprising removing at least a major amount of the low boiling component from said mixture by reducing pressure on said mixture with the mixture at a temperature sufficient to yield a low boiling component partial pressure of at least 50 mm. of mercury to decrease concentration of the low boiling component in the other component to enrich the other component, moving said enriched other component over a series of inclined surfaces as a flowing layer to expose the upper surface of said layer to a free vapor space, allowing each layer from each inclined surface to free fall from said surface while being contacted with hot vapors flowing in a direction opposite to the flow of said layer, controlling the temperature of the moving layer near the volatilization point of said low boiling component, by injecting steam

into the free vapor space to contact said layer, removing the counter flowing vapors from the system by a means at a pressure less than the pressure on said system, and removing the more concentrated mixture from said system.

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**4,303,480**

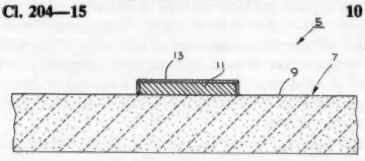
**ELECTROPLATING OF THICK FILM CIRCUITRY**

**John H. Wood, Balboa Island, and Victor A. Twaddell, Santa Ana, both of Calif., assignors to General Dynamics, Pomona Division, Pomona, Calif.**

**Filed Aug. 1, 1977, Ser. No. 821,004**

**Int. Cl.³ C25D 5/02**

**U.S. Cl. 204—15** **10 Claims**



1. An improved direct thermobondable and solderable thin film-thick film printed circuit composite consisting essentially of, in combination:

(a) a refractory substrate comprising alumina;

(b) a thick printed film of copper bonded to said substrate; and

(c) a thin electroplated film of gold enclosing and adherent to said thick film.

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**4,303,481**

**ELECTROPLATING DEVICE AND METHOD**

**Francois Mortier, Jonquieres, and Jean-Jacques Sabatier, Senlis, both of France, assignors to Centre Techniques des Industries Mecaniques, France**

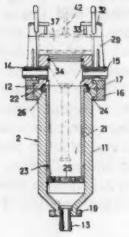
**Filed Jul. 29, 1980, Ser. No. 173,670**

**Claims priority, application France, Aug. 3, 1979, 79 19934**

**Int. Cl.³ C25D 7/00, 17/06**

**U.S. Cl. 204—25** **8 Claims**

1. An electrolytic plating device which comprises at least one electrolytic cell comprising: a tubular anode provided with an opening at its upper end for the introduction into it of the component to be electroplated, and provided at its lower part with an electrolyte inlet connection and at its upper part with at least one electrolyte outlet connection; means for causing a flow of electrolyte through said anode via said electrolyte inlet and outlet connections; a removable component-holder formed at its upper part with a cylindrical portion coming in tight adjustment with said tubular anode and formed at its lower part with a conical portion for the automatic centering of said component-holder during its introduction into said opening provided at the upper end of said tubular anode; a flange at the upper end of said component-holder for covering the upper edge of said tublar anode; sealing means between said cylindrical portion of said component-holder and the inner surface of said tubular anode; means for gripping said component to be electroplated provided for at the lower end of said conical portion of said component-holder; and means for electrically connecting said tubular anode and said component to be electroplated to a source of direct current.



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**4,303,482**

**APPARATUS AND METHOD FOR SELECTIVE ELECTROCHEMICAL ETCHING**

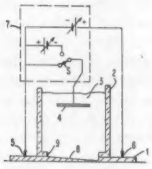
**Joachim Bühne, Heimsheim; Rolf Schäfer, Gärtringen-Rohrau, and Axel Stoffel, Gültingen, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 25, 1980, Ser. No. 143,661**

**Claims priority, application Fed. Rep. of Germany, Feb. 5, 1979, 2917654**

**Int. Cl.³ C25F 3/12, 7/00**

**U.S. Cl. 204—129.3** **11 Claims**



4. An improved method for electrochemically etching the surface of a workpiece where the etching is accomplished by transfer of material from the workpiece into the electrolyte which is in contact with a cathode, the improvement comprising:

maintaining a gradient in the potential of the surface of the workpiece,

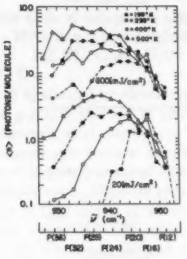
said gradient being maintained by applying multiple contacts to the surface of the workpiece and maintaining said contacts at predetermined potentials which are set so that the cathode is at least as negative as the lowest potential of said contact, and

said maximum potential between the cathode and any of said contacts being 100 V.

## 4,303,483
## LASER ISOTOPE SEPARATION AND GAS PURIFICATION BY MULTIPLE PHOTON ABSORPTION ENHANCED BY HEATING

David O. Ham, and Wei-Shin Tsay, both of Rochester, N.Y., assignors to The University of Rochester, Rochester, N.Y.

Filed Jan. 22, 1979, Ser. No. 5,407
Int. Cl.[3] B01D *59/00*
U.S. Cl. 204—157.1 R 14 Claims




1. In a method of separating a desired isotope or impurity from a gaseous mixture containing the isotope or impurity wherein the mixture is irradiated with a laser which selectively excites the desired isotope or impurity by means of multiphoton absorption of the energy of said laser,

the improvement which comprises the step of enhancing multiphoton absorption by heating the gaseous mixture, said isotope or impurity possessing spectral absorption features sufficiently distinct from the features of the remainder of the mixture to allow selective excitation when heated.

9. The method for separation of isotopes or impurities present in the molecules of a gas which have a spectral absorption shift larger than their spectral thermal shift and are selectively excitable when heated which comprises the steps of causing said isotopes or impurities to absorb multiple photons to selectively raise said isotopes or impurities to an excited energy state, heating said gas to enhance the multiple photon absorption by said isotopes or impurities while they are being caused to absorb multiple photons, and extracting said excited isotopes.

## 4,303,484
## PHOTOCURABLE ORGANOPOLYSILOXANE COMPOSITIONS

Minoru Takamizawa, Annaka; Fumio Okada, Takasaki; Yasuaki Hara, and Aoki, Hisashi, both of Annaka, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

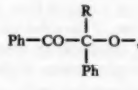
Filed Aug. 22, 1979, Ser. No. 68,593
Int. Cl.[3] C08F *2/46*
U.S. Cl. 204—159.13 11 Claims

1. A photocurable composition comprising

(a) an organopolysiloxane having at least two mercaptoalkyl groups directly bonded to the silicon atoms in a molecule and free from aliphatic unsaturation,

(b) an organopolysiloxane having at least two alkenyl groups directly bonded to the silicon atoms in a molecule, and

(c) an organopolysiloxane having at least one benzoin group represented by the general formula




where Ph denotes a phenyl group and R denotes a hydrogen atom or a lower alkyl group having from 1 to 4 carbon atoms, and directly bonded to the silicon atom in a molecule,

said composition having a viscosity in the range from about 50 to 10,000 centistokes at 25° C., and the amount of component (c) being from about 1 to 30 parts by weight per 100 parts by weight of component (a).

## 4,303,485
## ULTRAVIOLET POLYMERIZATION OF ACRYLATE MONOMERS USING OXIDIZABLE TIN COMPOUNDS

Dennis L. Levens, Hudson, Wis., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Aug. 20, 1979, Ser. No. 68,109
Int. Cl.[3] C08F *2/46*
U.S. Cl. 204—159.24 11 Claims

1. A photopolymerizable mixture comprising by weight

(a) 100 parts of a composition which is polymerizable to a viscoelastic state and consists of 50–100 parts of one or both of alkyl acrylate and alkyl methacrylate and 0–50 parts of copolymerizable monoethylenically unsaturated monomer,

(b) oxidizable tin salt dissolved in composition (a) in an amount providing at least 0.01 part of tin, and

(c) addition-polymerization photoinitiator which is activatable by ultraviolet radiation and is dissolved in composition (a) in an amount providing about 0.01–5 parts of the photoinitiator.

## 4,303,486
## METHODS OF PHOTOCATALYTIC DECARBOXYLATION OF SATURATED CARBOXYLIC ACID

Allen J. Bard, Austin, Tex., and Bernhard Kraeutler, Zurich, Switzerland, assignors to Board of Regents, University of Texas System, Austin, Tex.

Filed Mar. 28, 1979, Ser. No. 24,520
Int. Cl.[3] C07C *3/24*
U.S. Cl. 204—162 R 22 Claims

1. A method for decarboxylating an aliphatic carboxylic acid solution comprising:

providing an aliphatic carboxylic acid solution;

providing a suitable n-type semiconductor powder;

mixing said powder in said carboxylic acid solution to form a mixture;

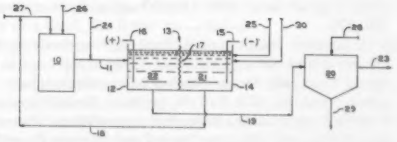
irradiating said mixture at a temperature and for a time sufficient for the evolution of carbon dioxide gas;

to form as the major reaction products carbon dioxide and the alkane corresponding to the carboxylic acid of said solution.

## 4,303,487
## PRODUCTION OF ALKALI METAL SILICATE HAVING A HIGH SILICA TO ALKALI METAL OXIDE RATIO

William W. Carlin, Portland, and Douglas W. McCann, Corpus Christi, both of Tex., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 897,962, Apr. 19, 1978, abandoned. This application Dec. 26, 1979, Ser. No. 107,221
Int. Cl.[3] C25B *7/00*
U.S. Cl. 204—180 P 4 Claims




1. A process for increasing the silica:alkali metal oxide

weight ratio of aqueous alkali metal silicate solution comprising:

(a) providing an electrolytic cell having a cathode compartment and an associated cathode and an anode compartment and an associated anode, said compartments separated by a cation selective permionic membrane;

(b) charging aqueous alkali metal silicate solution to the anode compartment, said solution having a silica: alkali metal oxide weight ratio of up to about 2.5:1, a pH of at least 11, whereby to maintain the solution free of colloidal suspension or sol of finely divided silica particles, and a water content of at least 75 percent by weight;

(c) charging water or aqueous alkali metal hydroxide solution to the cathode compartment;

(d) applying a direct current across the cell to decompose alkali metal oxide at the anode into alkali metal ions and gaseous oxygen and to cause said alkali metal ions to migrate from the anode compartment through the membrane into the cathode compartment therein forming alkali metal hydroxide;

(e) withdrawing aqueous alkali metal silicate solution from the anode compartment, said solution having a silica: alkali metal oxide weight ratio of about 3:1 to about 4.5:1 and a pH greater than 10, whereby to maintain the solution free of colloidal suspension or sol of finely divided silica particles; and

(f) withdrawing alkali metal hydroxide from and adding make-up water to the cathode compartment.

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**4,303,488**

## ELECTROCOATING WITH WATER-BORNE COATING COMPOSITION MADE FROM EPOXY RESIN, POLYMERIC ACID AND TERTIARY AMINE

**Henry K. Seiler, Woodbury, N.J., and Eugene G. Sommerfeld, Penn Valley, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 74,122, Sep. 14, 1979, Pat. No. 4,247,439, which is a continuation-in-part of Ser. No. 941,540, Sep. 15, 1978, abandoned, which is a continuation-in-part of Ser. No. 767,388, Feb. 10, 1977, abandoned, which is a continuation-in-part of Ser. No. 581,094, May 27, 1975, abandoned, which is a continuation-in-part of Ser. No. 413,372, Nov. 6, 1973, abandoned. This application Jun. 30, 1980, Ser. No. 162,240**

**Int. Cl.³ C25D *13/00***

**U.S. Cl. 204—181 R** **10 Claims**

1. In a process of electrocoating an electrically conductive surface serving as an anode which comprises passing electric current between said anode and a cathode in contact with an aqueous electrodepositable composition, the improvement wherein said electrode-positable composition comprises a water-borne coating composition consisting essentially of liquid carrier and the reaction product of:

(A) not less than 50% by weight, based on the weight of (A) plus (B), of an epoxy resin containing, on the average, two terminal 1,2-epoxy groups per molecule and having an epoxy equivalent weight of 750–5000;

(B) a carboxyl-functional polymer in an amount sufficient to provide at least 1.25 equivalents of carboxyl groups, when the source of the carboxyl group is a mono-protic acid, and at least 2.0 equivalents of carboxyl groups, when the source of such groups is a diprotic acid, per equivalent of 1,2-epoxy groups in the epoxy resin, said polymer having a weight average molecular weight (determined by light scattering) of about 5000–160,000 and an acid number of 100–500;

(C) an aqueous solution of at least 1.25 equivalents of a tertiary amine per equivalent of 1,2-epoxy groups in the epoxy resin, said tertiary amine being selected from the group consisting of $R_1R_2R_3N$, pyridine, N-methylpyrrole, N-methyl piperidine,' N-methyl pyrrolidine, N-methyl morpholine, and mixtures thereof and wherein $R_1$ and $R_2$ are substituted or unsubstituted monovalent alkyl groups containing one or two carbon atoms in the alkyl portion and $R_3$ is a substituted or unsubstituted monovalent alkyl weight divided by 1000; and

(E) optionally, 10–90% of the amount required for stoichiometric reaction with the carboxyl-functional polymer of (B) of at least one primary, secondary or tertiary amine or monofunctional quaternary ammonium hydroxide;

wherein for increasing ratios of carboxyl groups to 1,2-epoxy groups, the amount of amine is increased to keep the carboxyl-functional polymer water dispersible.

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**4,303,489**

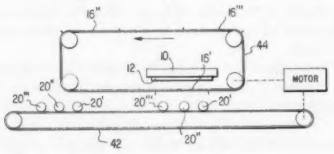
## METHOD AND APPARATUS FOR PRODUCING A VARIABLE INTENSITY PATTERN OF SPUTTERING MATERIAL ON A SUBSTRATE

**Charles F. Morrison, Jr., Boulder, Colo., assignor to Vac-Tec Systems, Inc., Boulder, Colo.**

**Filed Aug. 21, 1978, Ser. No. 935,359**

**Int. Cl.³ C23C *15/00***

**U.S. Cl. 204—192 R** **28 Claims**




1. A method of producing a dipole antenna having two variable electrical conductivity elements, said method comprising the steps of

activating a sputtering device having a cathode including electrical conductivity material to be sputtered on at least one substrate, a plasma being established adjacent said cathode whereby said electrical conductivity material is sputtered toward said substrate;

providing at least one mask having at least one patterned opening of fixed configuration therein between said cathode and said substrate so that (a) it is out of contact with the substrate and (b) it is no closer than about ¾ inch from the cathode;

providing a further mask in intimate contact with a portion of said substrate, said portion dividing the substrate into first and second areas where the two dipole elements are to be respectively deposited;

relatively moving at least said cathode and said substrate with respect to each other so that the electrical conductivity material passing through said patterned opening in the mask deposits on the substrate, the thickness of the deposited material varying across at least one dimension of said first and second areas of the substrate to thereby form said variable electrical conductivity elements of the antenna due to the fixed configuration of the patterned opening; and

depositing electrically conductive connector bands at opposite sides of said further mask.

4,303,490

## EXHAUST ELECTRODE PROCESS FOR EXHAUST GAS OXYGEN SENSOR

Terry J. Gold, Flint; Frederick L. Kennard, III, Holly; Paul C. Kikuchi, and Ralph V. Wilhelm, Jr., both of Flint, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 89,264, Oct. 29, 1979, Pat. No. 4,244,798, which is a continuation-in-part of Ser. No. 30,775, Apr. 17, 1979, abandoned. This application Sep. 22, 1980, Ser. No. 189,732

The portion of the term of this patent subsequent to Jan. 13, 1998, has been disclaimed.

Int. Cl.³ C23C *15/00*

U.S. Cl. 204—192 C 3 Claims

1. In a method of sputtering an electrode of at least one metal selected from the group consisting of platinum and palladium onto a vitrified zirconia solid electrolyte body for an electrochemical-type exhaust gas oxygen sensor, the improvement wherein a target of at least one metal selected from the group consisting of platinum and palladium spaced at least about 3.0 cm from the body is used in the sputtering, the metal is sputtered at a pressure of about 10–20 millitorr, and a sputtering power of about 13–22 watts/cm$^2$ of target area is used, whereby the electrode is porous as deposited and has an apparent surface area at least double the geometric area of the zirconia surface on which it lies.

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4,303,491

## APPARATUS FOR CLEANING THE BOTTOM OF ELECTROLYTIC MERCURY CATHODE CELLS

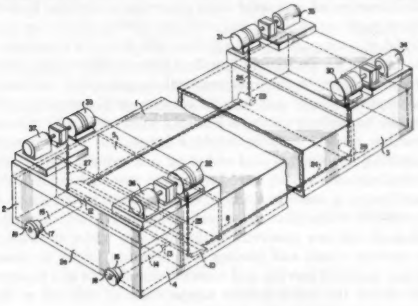
Giovanni Ferrari, Agnadello, and Giuseppe Villa, Venezia-Mestre, both of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Feb. 22, 1980, Ser. No. 123,942

Claims priority, application Italy, Feb. 27, 1979, 20552 A/79

Int. Cl.³ C25B *9/00, 1/40*

U.S. Cl. 204—279 8 Claims



1. Apparatus for cleaning the bottom of a mercury cathode electrolytic cell, by displacing the mercury sludge along said bottom while said cell is cut off from the power supply and maintained under suction, said apparatus comprising:

(a) a metal plate displaceable along said bottom and also capable of assuming a resting position within the inlet head of said cell during operation of said cell, said plate being composed of at least two consecutively arranged sections, each of said sections being connected to its neighboring section via hinge means, so that the combined length of said sections constitutes the length of said plate and is substantially coextensive with the width of said bottom;

(b) at least two rigid rods for pushing said plate along said bottom, each of said rods having one end connected to said plate and the other end projecting beyond the inlet head of and outside said cell, said other end adapted to be connected via quick-connection means to extension rods so as to form multiple-rod struts operable from outside the cell; and

(c) at least two supporting elements of electrically insulated material capable of supporting said plate while in said resting position and of raising said plate above said bottom thereby allowing flow of mercury and of the brine during operation of said cell.

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4,303,492

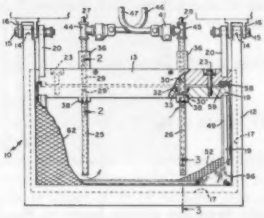
## ELECTRODE ASSEMBLY

Jack H. Eichler, Westport; Mark P. Freeman, Darien, and William A. Salancy, Norwalk, all of Conn., assignors to Dorr-Oliver Incorporated, Stamford, Conn.

Filed Jan. 4, 1980, Ser. No. 109,931

Int. Cl.³ C25D *17/10*

U.S. Cl. 204—300 R 10 Claims



1. An electrode assembly for electrically augmented vacuum filtration of a suspension of solids in a carrier liquid, which comprises,

an external non-conductive frame member,

an internal non-conductive frame member slidably fitting within said external frame member and thereby defining top, bottom and two side walls of an electrode chamber,

ion-pervious filter elements forming the remaining two side walls of an electrode chamber so that said electrode assembly can be immersed in said suspension of solids,

at least one electrode element within said electrode chamber electrically connected to a voltage source external of said electrode chamber and immersed in an electrolyte having a high conductivity,

the ratio of the total area of said ion-pervious filter elements immersed in said suspension of solids to the total area of said electrode element immersed in said electrolyte being at least 2:1 and no more than 350:1.

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4,303,493

## SEALING FRAME FOR STACKED ARRANGEMENT OF EXCHANGER MEMBRANES FOR ELECTRODIALYSIS

Klemens Kneifel, Geesthacht; Walther Hilgendorff, Tespe, and Uwe Martens, Hohnstorf, all of Fed. Rep. of Germany, assignors to GKSS-Forschungszentrum Geesthacht GmbH, Geesthacht-Tesperhude, Fed. Rep. of Germany

Filed Jan. 18, 1980, Ser. No. 113,362

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1979, 2902247

Int. Cl.³ B01D *13/02*

U.S. Cl. 204—301 5 Claims

1. A sealing frame for alternately arranged anion and cation exchanger membranes of a membrane stack used for electrodialysis of a fluid, the frame comprising:

edges which surround a chamber, which chamber is further defined by a cation membrane closing one side of the chamber and an anion membrane closing the other side of the chamber;

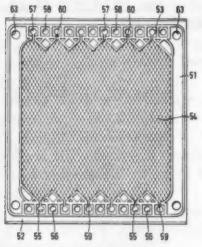
a screen member extending across the chamber inside of the frame;

connecting bores passing transversely through the edges of the frame in opposed first and second sides of the frame,

the connecting bores being closed to the chamber and conveying untreated fluid into the chamber on the first side and treated fluid away from the chamber on the second side;

supply bores alternating with the connecting bores on the first side of the frame and having outlets open to the chamber, said supply bores being in communication with connecting bores in an adjacent frame;

discharge bores alternating with the connecting bores on the second side of the frame and having inlets open to the chamber, said discharge bores being in communication with connecting bores in an adjacent frame; said discharge bores being disposed directly across from the connecting bores in the first side of the frame and being displaced




laterally from the supply bores in the first side of the frame, the supply bores being disposed directly across from the connecting bores in the second side of the frame whereby the supply and discharge bores are staggered with respect to one another, and

V-shaped projections having pointed apexes extending into the chamber along the first and second sides, said V-shaped projections beginning and terminating with the outlets of the supply bores along the first side of the frame and the inlets of the discharge bores along the second side of the frame to provide opposed zig-zag contours which form diverging channels into the chamber which are staggered with respect to converging channels out of the chamber.

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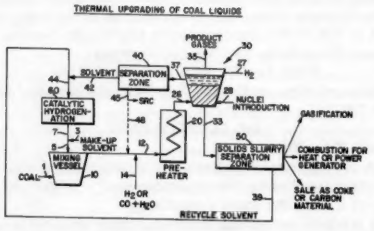
**4,303,494**

## CONTINUOUS REACTION/SEPARATION METHOD FOR NUCLEATED GROWTH REACTIONS

**Darrell D. Whitehurst, Titusville, N.J., and Tsoung Y. Yan, Philadelphia, Pa., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Aug. 6, 1979, Ser. No. 64,142**
**Int. Cl.³ C10G *1/00***
**U.S. Cl. 208—8 LE** **34 Claims**




1. An improved method for thermally upgrading coal liquids to form lower boiling hydrocarbons and coke which method comprises:

(a) tangentially introducing a coal liquid into the lower, smaller end of an elongated, vertical reaction zone of circular cross-section wherein the circular cross-sectional area generally decreases from top to bottom, thereby imparting an upward, swirling motion to the coal liquid in the reaction zone, the horizontal velocity at the bottom of the reaction zone being sufficiently large to cause fluidization of larger coke particles formed by nucleated growth in the reaction zone and concentration of them in the central, lower portion of the reaction zone and the vertical velocity at the top of the reaction zone being sufficiently small to avoid carry-over of smaller coke particles but sufficiently large to concentrate them in the upper portion of the reaction zone;

(b) maintaining the coal liquids in the reaction zone in a swirling, fluidized state at a temperature within the range from about 800° to 1100° $F_{.}$, a pressure of about 100 to 2500 psi, and for a residence time within the range from about 10 min. to 2 hours;

(c) at least periodically recovering the larger coke particles in substantially spherical form from the bottom of the reaction zone; and

(d) recovering substantially solids-free lower boiling hydrocarbons from the top of the reaction zone.

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**4,303,495**

## RECOVERY OF LIQUID AND GASEOUS HYDROCARBONS FROM RAW MATERIALS CONTAINING HYDROCARBONS SUCH AS OIL SHALE AND COAL

**Alfred Behrmann, Erlangen; Herbert Gottschlich, Dachsbach; Christian Koch, Erlangen, and Otto Abel, Clausthal-Zellerfeld, all of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim, Fed. Rep. of Germany**

**Filed Sep. 7, 1979, Ser. No. 73,529**
**Claims priority, application Fed. Rep. of Germany, Sep. 18, 1978, 2840575**
**Int. Cl.³ C10G *1/00;* C10J *3/68***
**U.S. Cl. 208—8 LE** **4 Claims**

1. Method for recovering liquid and gaseous hydrocarbons from comminuted raw solid fossil materials containing hydrocarbons such as oil shale and coal by adding oil to the raw material at a temperature of 610 K to 690 K and a pressure of 20 to 100 bar for a sufficient length of time to effect conversion of hydrocarbons in the raw material to gases and normally liquid hydrocarbons and a solid residue, and separating the normally liquid hydrocarbons from the solid residue by solvent extraction with a volatile liquid solvent, the improvement comprising introducing said added oil in a vaporous state into a heated reaction vessel, introducing said raw material into the heated reaction vessel at a temperature below the condensation temperature of the oil to cause said oil vapor to condense at the surface of said raw material, passing the raw material through the reaction vessel and heating said reaction vessel to cause said raw material leaving said reaction vessel to be at a temperature above the condensation temperature of said oil at the pressure prevailing in the reaction vessel.

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**4,303,496**

## COAL LIQUEFACTION PROCESS

**Leslie R. Rudnick, Trenton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Aug. 14, 1980, Ser. No. 178,214**
**Int. Cl.³ C10G *1/00, 1/06;* B09B *3/00***
**U.S. Cl. 208—8 LE** **8 Claims**

1. A process for the liquefaction of coal comprising admixing the coal to be subjected to liquefaction with lignin wherein the amount of lignin ranges from about 0.01 to about 1% based on the weight of the coal; introducing the mixture of coal and lignin to a dissolver wherein said mixture is subjected to elevated temperature and elevated pressure for a period of time ranging from 0.5 to 180 minutes

wherein said elevated temperature ranges from about 600° F. to about 1000° F. and wherein said elevated pressure ranges from about 50 to about 3000 psig; and

separating light hydrocarbon fractions from a mixture of ash, undissolved coal, deashed coal and high quality coal extracts.

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**4,303,497**

## DESULFURIZATION, DEMETALATION AND DENITROGENATION OF COAL

**Thomas O. Mitchell, Trenton; Darrell D. Whitehurst, Titusville, and Malvina Farcasiu, Princeton, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation of Ser. No. 945,281, Sep. 25, 1978, abandoned. This application Apr. 21, 1980, Ser. No. 142,189**

**Int. Cl.³ C10G *29/16***

**U.S. Cl. 208—10** **12 Claims**

1. A process for the desulfurization, demetalation and denitrogenation of coal or coal liquid charge stocks containing sulfur impurities which comprises contacting said charge stock in the absence of added hydrogen with a hydrogen donor solvent and with a catalyst comprising a naturally occurring porous metal ore selected from the group consisting of manganese nodules, bog iron, bog manganese, and nickel laterites.

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**4,303,498**

## PROCESS FOR MANUFACTURE OF SOLVENT FOR COAL LIQUEFACTION

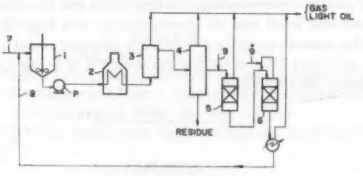
**Tsukasa Chikata; Yoshihiko Sunami; Keiichi Sasaki, and Kunihiko Nishioka, all of Amagasaki, Japan, assignors to Sumitomo Metal Industries Limited, Osaka, Japan**

**Filed Jun. 6, 1980, Ser. No. 157,451**

**Claims priority, application Japan, Jun. 12, 1979, 54-74440; Jun. 12, 1979, 54-74442; Dec. 19, 1979, 54-166142**

**Int. Cl.³ C10G *7/00, 1/04***

**U.S. Cl. 208—93** **2 Claims**




1. A process for the production of a solvent for use in coal liquefaction comprising the steps of (a) separating the liquid product resulting from the liquefaction of coal into a first fraction boiling at temperatures of less than 200° C., a second fraction boiling at 200° to 210° C., a third fraction boiling at 211° to 250° C. and a fourth fraction boiling at temperatures of not less than 251° C., (b) subjecting said third fraction to a first hydrogenation treatment, (c) subjecting the hydrogenated product of step (b) to a second hydrogenation treatment, (d) mixing the hydrogenated product of step (c) with at least a part of the second fraction of step (a) to form a resultant mixture, and (e) mixing not less than 50% of said resultant mixture with not more than 50% of the fourth fraction of step (a) to form the solvent.

**4,303,499**

## PROCESS FOR THE PRODUCTION OF A TRANSFORMER OIL

**Walter Geistert, Hamburg; Ulrich Krämer, Buchholz, and Gottfried Klippel, Aumühle, all of Fed. Rep. of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Fed. Rep. of Germany**

**Continuation of Ser. No. 830,293, Sep. 2, 1977, abandoned. This application Feb. 9, 1979, Ser. No. 10,873**

**Claims priority, application Fed. Rep. of Germany, Sep. 11, 1976, 2641055**

**Int. Cl.³ C10G *73/02***

**U.S. Cl. 208—33** **7 Claims**

1. A method for preparing a stable age-resisting mineral oil composition which comprises subjecting a nitrogen-containing paraffin base crude petroleum to distillation to produce a distillate fraction boiling in the range of about 270° to 400° C. having a viscosity in the range of 6 to 25 cst and a flashpoint of at least 130° C., subjecting said distillate fraction to solvent extraction with a solvent selective for aromatic hydrocarbons to produce:

(a) a solvate consisting of at least about 70% of said distillate fraction, and

(b) an extract fraction,

subjecting said solvate "a" to refining to produce a refined raffinate fraction,

subjecting said extract fraction "b" to vacuum distillation to produce a nitrogen-containing extract concentrate residue consisting of from about 10 to 20 volume percent of said extraction fraction "b", containing from 3 to 8 percent by weight nitrogen,

and adding said nitrogen-containing extract concentrate residue to said raffinate fraction to produce a stable age-resisting mineral oil comprising from about 0.0001 to 5 weight percent of said nitrogen-containing extract concentrate residue and the balance said raffinate fraction.

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**4,303,500**

## REFORMING WITH MULTIMETALLIC CATALYSTS

**Paul E. Eberly, Jr.; Charles H. Mauldin, and William C. Baird, Jr., all of Baton Rouge, La., assignors to Exxon Research & Engineering Co., Florham Park, N.J.**

**Division of Ser. No. 53,375, Jun. 29, 1979, Pat. No. 4,265,786. This application Nov. 12, 1980, Ser. No. 206,091**

**Int. Cl.³ C10G *35/085***

**U.S. Cl. 208—139** **12 Claims**

1. A process for reforming a hydrocarbon feed at reforming conditions which comprises contacting said feed with a catalyst which comprises from about about 0.1 to about 2 percent platinum, from about 0.01 to about 0.1 percent copper, from about 0.001 to about 3 percent selenium, and from about 0.1 to about 2.5 percent halogen composited with an inorganic oxide support.

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**4,303,501**

## PROCESS FOR THE CONTINUOUS SEPARATION OF DISCARDED HYGIENE ARTICLES INTO THEIR COMPONENTS

**Bert Steffens, Aufader Jaugel 5, D-5470 Andernach 13, Fed. Rep. of Germany**

**Filed Oct. 9, 1979, Ser. No. 82,925**

**Claims priority, application Fed. Rep. of Germany, May 7, 1979, 2918345**

**Int. Cl.³ B07B *15/00*; D01G *11/04***

**U.S. Cl. 209—2** **3 Claims**

1. A process for the continuous separation of discarded hygiene articles made of (1) flock, cut or mixed flock and cut absorbent materials and (2) sheet covering for said absorbent material comprising first tearing the discarded hygiene articles into large pieces and then conducting the pieces over a plurality of superposed oscillating sieves having successively decreasing mesh widths with the sieve having the smallest mesh

width being lowermost with the remaining sieves being positioned thereabove in the order of increasing distance between the meshes, the smallest mesh width being so selected that the absorbent material will pass through the sieve and the torn covering will remain as a sieve residue, passing the absorbent material through the sieves, collecting the large pieces of torn coverings as sieve residue and removing said collected pieces.

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**4,303,502**

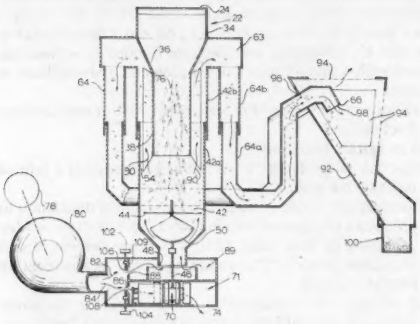
## HERB PROCESSING MACHINE

**Douglas M. Lacher, 20244 Hazelcrest, Palatine, Ill. 60067**

**Filed Jul. 14, 1980, Ser. No. 168,711**

**Int. Cl.³ B03B *1/00***

**U.S. Cl. 209—3** **9 Claims**



7. A portable plant material processing machine comprising:

a housing sized to be carried by an operator and operable on a counter top;

wall means partitioning the interior of said housing into a centrally disposed upright cylindrical stripping chamber, and

an intermediate air passage compartment;

rotatable stripping means carried in said stripping chamber;

a motor and blower unit in said housing discharging a stream of pressurized air into said air passage compartment;

means forming an inlet throat between said air passage compartment and said stripping chamber;

a feeding tube being telescopically insertable into said stripping chamber;

means for adjusting the axial position of the feeding tube in the stripping chamber;

guide means between said feeding tube and said stripping chamber to guide and retain said tube in an adjusted axial position and forming air passages disposed in an annulus around said feeding tube;

conduit means in said housing having one end connected to said stripping chamber through said air passages and the other end leading to another portion of said housing;

a collection chamber formed in said housing into which said conduit means discharge;

whereby a supply of plant material may be introduced into the feeding tube while the stripping means is rotating so that the leafy portions will be separated and blown upwardly in said passage for removal to the collector chamber.

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**4,303,503**

## MACHINE FOR SORTING ARTICLES

**Yvan de R. de Mimerand, and Jean Goullet, both of Paris, France, assignors to Hotchkiss-Brandt Sogeme H.B.S., Paris, France**

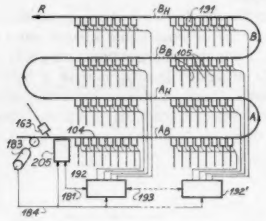
**Filed Jun. 30, 1978, Ser. No. 921,225**

**Claims priority, application France, Jul. 5, 1977, 77 20658**

**Int. Cl.³ B07C *5/36*; B65G *47/49***

**U.S. Cl. 209—3.3** **4 Claims**

1. A machine for sorting articles each carrying an address indicator marking and carried by a clip which acts as a connection between the article which it carries and a fixed or moving support element, said machine comprising: an intermediate storage rod which is intended to receive articles coming from work stations situated upstream of the storing machine; a series of support elements in the form of lugs; a transfer device, having a first and a second end, for carrying said lugs in first and second parallel continuous paths, said paths each having a first high level and a second corresponding low level beneath said first high level; a series of receiving rods equal in number to the number of possible addresses of said articles located along said first and second paths; wherein said machine has two parallel faces including a front face and a rear face and wherein said lugs in and said receiving rods along said first and second paths are arranged at the first high level and second low level, corresponding thereto at said front face of the machine and said rear face of said machine, said machine further comprising at least one extracting and engaging means for



extracting the clips one by one from said intermediate storage rod and engaging them one each on a separate one of said lugs on the fly, disengaging means for disengaging on the fly each said clip from the said lugs and engaging each said clip onto the appropriate receiving rod for the article which it is carrying as soon as the respective positions of the lugs on which said clip is being carried and of said appropriate receiving rod coincide; said transfer device first end comprising means for carrying said lugs between one of said second low level and its corresponding first high level and the other of said second low level and it corresponding first high level, said machine further including means, disposed at said first end, for causing the articles carried by said clips on at least one of two said faces to overlap each other as they pass between one of said second low level and its corresponding first high level and the other of said second low level and its corresponding first high level; said overlap means comprising means for pivoting about a vertical axis each said clip on the lug on which it is being carried by engaging each said clip.

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**4,303,504**

## MAGNETIC FILTRATION

**Gerald Collins, Thurso, Scotland, assignor to United Kingdom Atomic Energy Authority, London, England**

**Filed Aug. 25, 1980, Ser. No. 180,931**

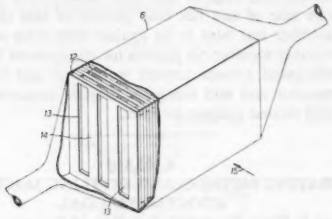
**Claims priority, application United Kingdom, Sep. 7, 1979, 31066/79**

**Int. Cl.³ B03C *1/02***

**U.S. Cl. 209—223 R** **4 Claims**

1. A magnetic filter comprising a housing, inlet means to the housing for a liquid to be filtered, outlet means from the housing for filtrate, a ferromagnetic filter member in the form of an array of spaced apart substantially parallel bars of rectangular cross-section located within the housing between the inlet and outlet means with the longitudinal axes and the longer of the transverse axes of the bars being substantially normal to liquid flow through the housing, and magnet means outside the hous-

ing for creating a magnetic field across the filter member, the magnetic field being directed substantially normal to the longi-



tudinal axes of the bars and substantially parallel to the longer cross-sectional side of each rectangular bar.

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**4,303,505**

## SELECTIVE SEPARATION OF HYDROPHILIC COMPONENT FROM MIXTURES USING PASTES

**Charles E. Capes, Ottawa, and Richard D. Coleman, Orleans, both of Canada, assignors to Arcanum Corporation, Ann Arbor, Mich.**

**Filed Oct. 18, 1979, Ser. No. 86,108**
**Int. Cl.³ B03B *1/04***
**U.S. Cl. 209—5** **20 Claims**

12. A process for removing hydrophilic inorganic, ash-forming constituents from a flowable slurry of coal particles in a hydrophobic organic oil, which comprises the steps of: contacting said slurry with a fluent tenacious layer of a paste prepared by mixing water with fine particles of inorganic hydrophilic adsorbent which adsorbent is insoluble or substantially insoluble in water, insoluble in said organic oil, inert to said organic oil and the carbonaceous combustible constituents of said coal and which preferentially adsorbs the hydrophilic, inorganic, ash-forming constituents of said coal, without adsorbing substantial amounts of carbonaceous combustible constituents of the coal, and moving said slurry across the surface of said layer of paste to gently agitate said layer of paste, without destroying the structural integrity of the layer, to continually expose different portions of said paste on the surface of the layer and contact same with said slurry so that said hydrophilic, inorganic, ash-forming constituents become preferentially wetted by the water in said paste and are adsorbed by said hydrophilic adsorbent, and then separating the remainder of said slurry from said paste.

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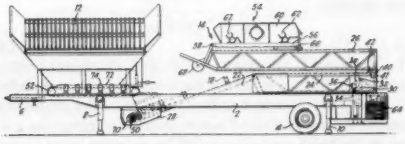
**4,303,506**

## SCREENING APPARATUS

**John A. Finlay, Ballygawley, Northern Ireland, assignor to John Finlay (Engineering) Limited, Ballygawley, Northern Ireland**

**Filed May 5, 1980, Ser. No. 146,306**
**Claims priority, application United Kingdom, May 16, 1979, 17098/79**
**Int. Cl.³ B07B *1/46***
**U.S. Cl. 209—247** **4 Claims**



1. A mobile screening apparatus for separating particulate material of different sizes comprising:

a wheeled chassis;

an elongated conveyor adjustably mounted on the wheeled chassis for movement on the chassis between an elevated operational position and a folded transporting position, the conveyor including a lower rear section having a lower and an upper end and pivotally connected at the lower end to the chassis for movement between a lowered transporting position generally parallel with the chassis and an elevated operational position extending at an angle to the chassis, and an upper front section having a lower and an upper end, the lower end of the upper section being pivotally connected with the upper end of the lower section for folding between an operational position extending generally in alignment with the lower section and a transporting position generally parallel with and on top of the lower section; and

a screening device pivotally connected to the upper end of the upper section of the conveyor for folding movement between an operational position projecting from the upper section and a transporting position generally parallel with and on top of the upper section; and

actuating means extending between the wheeled chassis and the elongated conveyor to move the conveyor between lowered and elevated positions.

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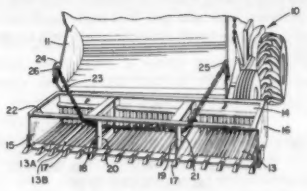
**4,303,507**

## SCRAPER-SIFTER AND DISTRIBUTING DEVICE

**Wedad J. Smith, El Paso, Tex., assignor to Wrex-All Implements, Inc., Thibodaux, La.**

**Filed Oct. 29, 1980, Ser. No. 201,768**
**Int. Cl.³ B07B *1/28***
**U.S. Cl. 209—252** **1 Claim**



1. For use with a front end loader having a loading bucket with key slot openings at the base of the front end of each of its sidewalls, a ground-leveling and separating device comprising, a substantially flat main blade having a slotted rear portion, a concavo-convex blade backing trowel member secured to the rear of the slotted portion of the main blade with the concavity thereof directed rearwardly of the main blade, end and rear walls upstanding from said blade, a pair of transversely spaced dividers having front to rear openings and a front bar joining said end walls and dividers, attaching means one end of which is adapted to be connected to the rear of the front end loader bucket and the other end connected to the rear of said device, and attaching means connected proximate the forward end of said front end loader bucket at each of its ends and adapted to be passed over said front bar and passing freely through the openings in said spaced dividers so that said ground-leveling and separating device could be selectively angularly oriented relative to said bucket and line of draft.

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**4,303,508**

## SCREENING DEVICE

**Arne Skretting, Karlstad, Sweden, assignor to Kamyr Aktiebolag, Karlstad, Sweden**

**Filed Apr. 2, 1980, Ser. No. 136,749**
**Claims priority, application Sweden, Apr. 5, 1979, 7903032**
**Int. Cl.³ B07B *1/24, 1/52***
**U.S. Cl. 209—297** **11 Claims**

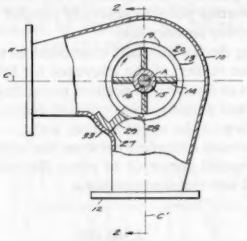
1. A screening assembly comprising

a closed housing having an inlet, a first outlet, and a second outlet;

a screen drum mounted for rotation about an axis and having a plurality of circumferential through-extending slots formed along the exterior periphery thereof, and disposed in planes substantially perpendicular to said axis of rotation;

means for rotating said drum about its axis of rotation;

means for mounting said drum for rotation about said axis within said housing so that suspension passing from said inlet to said second outlet must pass through said drum



slots, said second outlet being essentially coaxial with said drum, and so that suspension flows past said drum from said inlet to said first outlet; and

means for preventing short-circuiting of suspension flow from said inlet to said first outlet and for dislodging suspension particles caught within said drum slots, said means comprising a barrier member mounted in said housing between said inlet and first outlet and having a plurality of comb-like teeth extending into said drum circumferential slots.

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**4,303,509**

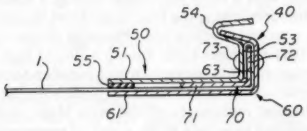
**SEPARATING APPARATUS**

**Kenneth R. Lilie, 11403 Sageking, Houston, Tex. 77089**

**Filed Aug. 28, 1980, Ser. No. 182,122**

**Int. Cl.³ B07B *1/46***

**U.S. Cl. 209—403** **6 Claims**



1. Apparatus for separating solid materials from mixtures having said solid materials therein including a wire mesh screen two opposing edges of which are retained by preformed elongated rigid retainer assemblies against which oppositely directed forces may be applied for placing said screen in tension, said rigid retainer assemblies comprising:

a first rigid retainer member preformed to include an elongated flat base portion having a free distal edge and a proximal edge from which upwardly projects a curved rib portion providing an elongated arcuate convex surface facing away from said distal edge of said base portion;

a second rigid retainer member preformed to include an elongated base portion having a free distal edge and a proximal edge from which upwardly projects a curved rib portion providing an elongated arcuate concave surface facing toward said distal edge of said base portion;

a third rigid retainer member preformed to include a flat elongated base portion for sandwiching between said flat base portions of said first and second retainer members and from one edge of which upwardly projects a rib portion for disposition between said elongated arcuate convex surface of said first retainer member and said elongated arcuate concave surface of said second retainer member;

said opposing edge of said wire mesh screen lying against one side of said flat base portion of said third retainer member and bent to lie against both sides of said third retainer member rib portion for engagement by both said elongated arcuate convex surface of said first retainer member and said elongated arcuate concave surface of said second retainer member.

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**4,303,510**

**OPERATING METHOD AND SETTLING MACHINE FOR PROCESSING COAL**

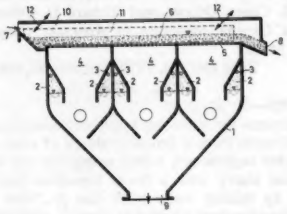
**Hannes S. Horn, Dortmund, Fed. Rep. of Germany, assignor to Klöckner-Humboldt-Deutz AG, Fed. Rep. of Germany**

**Filed Mar. 3, 1980, Ser. No. 126,988**

**Claims priority, application Fed. Rep. of Germany, Mar. 2, 1979, 2908229**

**Int. Cl.³ B03B *5/12, 5/18, 5/20***

**U.S. Cl. 209—457** **6 Claims**



1. In a method of processing mineral mixtures in which a layer of material to be processed travels from a material inlet to a material discharge on a jig structure over a separating liquid and is subjected to periodic pulsations of the separating liquid, which pulsations include a base wave and a superposed high frequency wave, the improvement therein comprising the steps of:

pneumatically generating the base wave in the separating chamber; and

mechanically generating and superposing a harmonic of the base wave on the base wave at a point above the separating chamber in the area of the layer of the material to be processed by generating the higher frequency wave to proceed transversely with respect to the base wave.

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**4,303,511**

**METHOD OF PURIFYING TENSIDE AND DETERGENT CONTAMINATED WASTE WATERS**

**Erwin Schieder, Nuremberg, and Rupert Stoiber, Erlangen, both of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Müheim, Fed. Rep. of Germany**

**Filed Aug. 14, 1979, Ser. No. 66,414**

**Claims priority, application Fed. Rep. of Germany, Aug. 16, 1978, 2835763**

**Int. Cl.³ C02F *1/52***

**U.S. Cl. 210—724** **3 Claims**

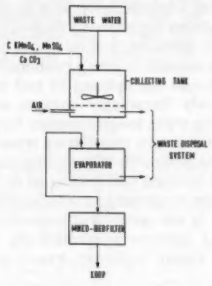
1. Method of purifying tenside-and detergent-containing contaminated waste waters of nuclear power plant installations and other plants in which radioactive substances are processed, wherein the contaminated water is prior to return to a water loop of the plant, passed through an evaporator and a mixed-bed filter, the improvement comprising

(a) adjusting the pH of the contaminated waste water to a value of 2.5 to 3 by the addition of sulfuric acid,

(b) adding the following reactants to the contaminated waste water:—finely-divided activated carbon, $KMnO_4$, $MnSO_4$ and $CaCO_3$,

(c) agitating the waste water and reactants to effect intimate mixing of the reactants with the waste water

(d) adjusting the pH of the mixture to a value of 8.5–9 by the addition of an alkaline material, and




(e) settling the alkaline mixture to form a lower sludge layer and a supernatant water layer of reduced contaminant content which is subsequently passed to the evaporator and mixed-bed filter.

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**4,303,512**

## APPARATUS FOR INDICATING THE LOADING ON AN ION EXCHANGER WITH RESPECT TO A SPECIFIC METAL OR GROUP OF METALS

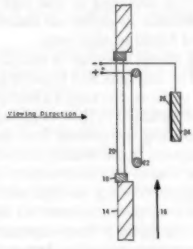
**Otto Inacker, Immenstaad, and Berthold Sessler, Würzburg, both of Fed. Rep. of Germany, assignors to Dornier-System GmbH, Friedrichshafen, Fed. Rep. of Germany**

**Filed Jun. 27, 1980, Ser. No. 163,885**

**Claims priority, application Fed. Rep. of Germany, Jul. 12, 1979, 2928123**

**Int. Cl.³ B01J *47/14***

**U.S. Cl. 210—93** **9 Claims**




1. In a system comprising ion exchanging means and a stream of liquid comprising ions of at least one specified metal flowing in a predetermined direction through said ion exchanging means, apparatus for furnishing an indication of the complete loading of state of saturation of said ion exchanging means with respect to said specific metal, comprising

a first and second electrode positioned in said liquid following said ion exchanging means in said predetermined direction; and

means connected to said electrodes for creating therebetween a predetermined potential differnce so that said specified metal when not retained in said ion exchanging means forms a deposit on one of said electrodes.

**4,303,513**

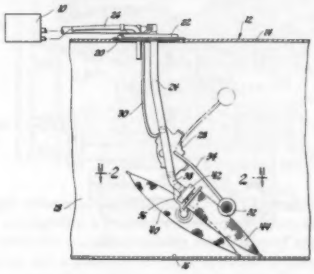
## DUAL PICK-UP FUEL STRAINER ASSEMBLY

**Roger J. Lundquist, Grand Ledge, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jan. 21, 1981, Ser. No. 226,623**

**Int. Cl.³ B01D *35/02***

**U.S. Cl. 210—132** **1 Claim**



1. A diesel fuel pick-up and fuel strainer assembly comprising:

a fuel pick-up tube having first and second branch-like inlets and a single outlet;

a first fuel pick-up strainer attached to said first inlet and being made with a fine mesh having openings sufficiently small in the micron range, and made of a suitable material, so as to pass fuel therethrough but not fuel wax crystals or water;

a second fuel pick-up strainer attached to said second inlet and being made with a coarse mesh having openings sufficiently large in the micron range, and made of a suitable material, so as to pass fuel and fuel wax crystals therethrough but not water;

and a normally closed vacuum relief valve in said second inlet, said valve being set to open at a predetermined vacuum level corresponding to a predetermined functional decrease in the passing of fuel through said first strainer;

said assembly when operating normally acting to strain and pick-up fuel through said first strainer and said first inlet, and operable, when said first strainer becomes so congested by fuel wax crystals or the like as to limit the amount of fuel strained therethrough with the result that a vacuum in said pick-up tube reaches said predetermined vacuum level to open said vacuum relief valve, to pick up fuel and fuel wax crystals suspended in the fuel through said second strainer and said second inlet.

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**4,303,514**

## FILTER DEVICE

**Mats Theorell, Nygatan 18, 330 12 Forsheda, Sweden**

**Filed Mar. 24, 1980, Ser. No. 133,116**

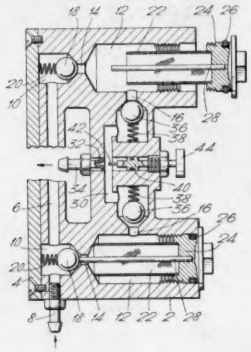
**Claims priority, application Sweden, Mar. 27, 1979, 7902710**

**Int. Cl.³ B01D *27/10***

**U.S. Cl. 210—136** **2 Claims**

1. A filtering device for filtering a fluid flowing through the filtering device, comprising a main inlet and a main outlet, at least two filter chambers each having an inlet opening and an outlet opening, said filter chambers being connected between said main inlet and said main outlet so that said fluid flows through all said filter chambers during normal operation of the device, a removable filter element positioned in each of said filter chambers between said inlet opening and outlet opening thereof, a releasable closure means which is adapted to close the inlet opening of each filter chamber when the filter element is removed therefrom, a control element operatively connected with each said filter element and removably connected

to each said filter chamber to maintain said closure means in an open position when said filter element is operatively positioned in the filter chamber, and means responsive to the fluid pressure between said main inlet and main outlet within the filtering device to automatically close said outlet opening of the filter chamber when the filter element is removed therefrom.



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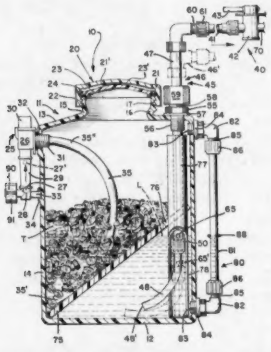
**4,303,515**

## CHEMICAL DISPENSER FOR BODIES OF WATER

**Thomas P. Rademacher, Medina, Ohio, assignor to McNeil Corporation, Akron, Ohio**

**Filed Apr. 14, 1980, Ser. No. 139,690**
**Int. Cl.³ B01D *33/38***
**U.S. Cl. 210—169** **11 Claims**



**1.** A chlorinator for chemically treating with tablets water in a swimming pool having a water recirculating system including a pump with output and input sides comprising, a cannister having a bottom, a top with an opening and connecting sides, lid means for effecting fluid-tight sealing of the top opening of said cannister, inlet means supplying water to said cannister from the output side of the pump, outlet means transferring treated water from said cannister to the input side of the pump, support means angularly disposed between said bottom of said cannister and the connecting sides to submerge a substantially uniform quantity of the tablets in the water, and controller means adjustable relative to said cannister to establish the water level in said cannister and supply uniformly treated water through said outlet means, said controller means including conduit means a portion of which remains proximate the bottom of said cannister and said support means for removing uniformly treated water and said conduit means having port means establishing the water level in said cannister by movement to various positions between said bottom and said top of said cannister.

**10.** A chlorinator for chemically treating with tablets water in a swimming pool having a water recirculating system including a pump with output and input sides comprising, a cannister having a bottom, a top with an opening and connecting sides, lid means for effecting fluid-tight sealing of the top opening of said cannister, said lid means having a cup-shaped body and disk movable in tilting relationship thereto such that said disk seals said top opening of said cannister while said cup-shaped body threadingly engages said cannister, inlet means supplying water to said cannister from the output side of the pump, outlet means transferring treated water from said cannister to the input side of the pump, support means angularly disposed between said bottom of said cannister and the connecting sides to submerge a substantially uniform quantity of the tablets in the water, and controller means adjustable relative to said cannister to establish the water level in said cannister and supply uniformly treated water through said outlet means.

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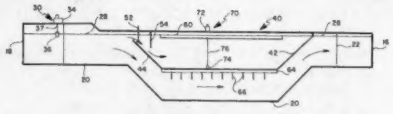
**4,303,516**

## ORBITAL WASTEWATER TREATMENT SYSTEM WITH INTEGRAL CLARIFICATION

**H. David Stensel, Summit Park; Peter Maier; Mark G. Biesinger, both of Salt Lake City; David R. Refling, Summit Park; Ronald P. Klepper, and John V. Maxham, both of Salt Lake City, all of Utah, assignors to Envirotech Corporation, Menlo Park, Calif.**

**Filed Oct. 14, 1980, Ser. No. 196,404**
**Int. Cl.³ C02F *3/16***
**U.S. Cl. 210—195.4** **8 Claims**



**1.** A system for treating wastewater comprising:

(a) a tank having at least two sidewalls, at least two end walls, and a bottom;

(b) at least one partition mounted in said tank substantially parallel to said sidewalls to define an endless, circuitous channel for flow of liquid in said tank;

(c) aerating-impelling means mounted in said tank for mixing gas with the liquid in said tank and impelling the liquid to flow through said endless, circuitous channel;

(d) a wastewater inlet mounted in flow communication with said tank for introducing wastewater into said tank;

(e) clarifier means disposed in the endless, circuitous channel having liquid inlet means to receive part of the liquid, including mixed liquor, flowing through said channel and to retain the liquid in a quiescent zone so that biological sludge settles from the liquid to form supernatant clarified liquid, said clarifier means extending between one of said sidewalls and said partition, and said clarifier means further including

(i) a first baffle extending at least between one of said sidewalls and one of said partitions,

(ii) a second baffle spaced apart from said first baffle and extending at least between one of said sidewalls and one of said partitions to form the quiescent zone between said first and second baffles, and

(iii) a floor means extending between the lower ends of said first and said second baffles,

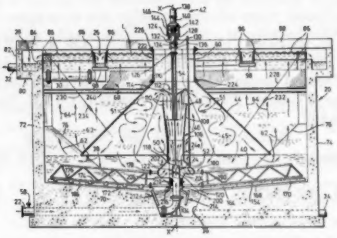
(f) sludge transfer means to convey sludge from said clarifier means to said circuitous channel; and

(g) liquid outlet means connected in fluid flow communication with said clarifier means to remove clarified liquid from the quiescent zone of said clarifier means.

## 4,303,517
## LIQUID TREATMENT APPARATUS

**Leonard S. Love, Mississauga, and Roger N. Crathern, Inglewood, both of Canada, assignors to Sydlo Inc., Mississauga, Canada**

**Continuation of Ser. No. 156,149, Jun. 3, 1980, abandoned, which is a continuation of Ser. No. 3,321, Jan. 15, 1979, abandoned. This application Dec. 1, 1980, Ser. No. 211,872**
**Int. Cl.³ C02F *1/52*; B01D *21/01***
**U.S. Cl. 210—208** **10 Claims**



1. Liquid treatment apparatus comprising:

a tank for containing a body of liquid and having a bottom wall;

an inlet for liquid to be clarified disposed generally centrally of said bottom wall and extending about a generally vertical axis, said inlet being arranged to direct influent liquid generally vertically upwards in said tank;

a generally conical partition member extending about said axis and disposed in said liquid above said inlet so that a liquid circulation zone is defined below said member;

a tubular eductor member disposed generally vertically below said generally conical member on said vertical axis and arranged so that liquid entering the tank from said inlet flows upwardly in said member, said member having an open upper end from which liquid enters said liquid circulation zone, and an open lower end disposed relative to said liquid inlet so that liquid entering the eductor member from the inlet entrains surrounding liquid and establishes a recirculation of liquid below said partition member;

deflector means disposed above said open upper end of the eductor member and arranged to outwardly deflect liquid leaving said member;

liquid outlet means disposed generally at the level of the surface of said body of liquid and through which clarified liquid can leave the tank;

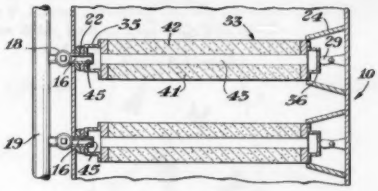
sludge outlet means disposed generally centrally of the bottom wall of said tank and through which settled particles can be removed as a sludge; and

a sludge scraper assembly which is rotatable in the tank about said generally vertical axis and which is rotationally located with respect to said axis, said assembly including: said tubular eductor member; scraper means adapted to move over said bottom wall of the tank as said assembly rotates and to convey settled particles towards said sludge outlet; drive means supported above the level of said body of liquid for rotating said scraper means; a driving member drivably coupled to said drive means, said driving member extending down into the tank generally along said axis and being rotatable about said axis when said drive means is operated; said tubular eductor member being coupled to said scraper means and to said driving member so as to transmit rotational movement of said driving member to said scraper means and cause the latter to convey settled particles to said sludge outlet.

## 4,303,518
## LOW PRESSURE HIGH VOLUME FILTER APPARATUS

**Sandor Grosshandler, Middleburg Heights, Ohio, assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Nov. 25, 1977, Ser. No. 854,931**
**Int. Cl.³ B01D *27/00, 29/32***
**U.S. Cl. 210—236** **5 Claims**




1. A high volume low pressure drop filter assembly, the filter assembly comprising a container having a bottom and at least one side wall, the container having a plurality of spaced-apart guide means and a plurality of open-ended first conduits with the first conduits disposed adjacent the bottom of the container and extending generally parallel thereto, the terminal end of each of the first conduits being in generally fixed spaced relationship from one of the guide means, disposed within the guide means at least one cam which on rotation moves toward or away from the first conduit associated with the guide means, a plurality of generally rectangular filter plates, the filter plates comprising a generally hollow rectangular frame defining a generally rectangular passageway from one side of the frame to the other side of the frame, a first filter element adjacent a first side of the frame, a second filter element adjacent the second side of the frame, the first and second filter elements being generally spaced apart from each other and maintained in fixed relationship in the hollow rectangular frame, a conduit receiving passage defined in one edge of the frame and having liquid-tight sealing means associated therewith, said frame being of sufficient size to extend between a conduit and its associated guide means, the guide means adapted to receive an edge of the rectangular frame remote from the conduit receiving passage, maintaining the frame in a generally vertical position, the edge supported by the guide means and remote from the conduit receiving passage engaging the cam and the guide means maintaining the filter elements in a generally fixed position within the container and a second conduit communicating with space exterior to the filter plates within the container.

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## 4,303,519
## QUICK DISCONNECT BAG FILTER

**Evo DelVecchio, 2 Worcester St., Clinton, Mass. 01510**

**Filed Apr. 14, 1978, Ser. No. 896,367**
**Int. Cl.³ B01D *29/30***
**U.S. Cl. 210—238** **1 Claim**

1. A quick disconnect bag filter apparatus comprising a first disc, a plain unimpeded opening centrally thereof, a second thicker disc commensurate with the first disc and having a threaded opening centrally thereof, said openings being aligned axially, both discs being flat and co-planar at both sides,

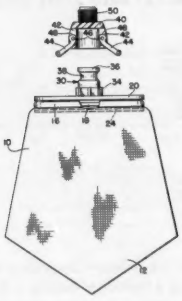
an annular recess in the periphery of the second disc at one side thereof, the recess facing the first disc and the side having the recess being adapted to flatly contact the adjacent side thereof forming an annular groove therewith, wherein the groove is between the first disc and the larger diameter unrecessed part of the second disc,

a bag filter having an open mouth, a snap-ring connected to the filter about the mouth thereof, the snap ring being adapted to be lodged in the groove,

a first tubular fitting having a threaded portion passing through the opening in the first disc and detachably engaging the threads of the opening in the second disc and

securing the discs together in flatwise contacting relation with the snap ring held in the groove, the snap ring having a diameter less than that of either disc,

another portion of the fitting being exposed and having an



annular reduced portion, a second tubular fitting having quick detach means to secure it to the first fitting in the reduced portion thereof, both fittings having corresponding fluid passages therethrough,

and a hose connection to the second fitting.

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**4,303,520**

**SURFACE EXTRACTION APPARATUS**

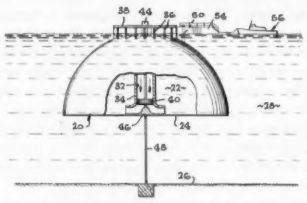
**Leslie S. Wirt, Newhall, Calif., assignor to Lockheed Corporation, Burbank, Calif.**

**Filed Jun. 27, 1980, Ser. No. 163,880**

**The portion of the term of this patent subsequent to May 8, 1996, has been disclaimed.**

**Int. Cl.³ E02B *15/04***

**U.S. Cl. 210—242.1** **2 Claims**



1. Apparatus for extracting material floating on the surface of a fluid, said surface having waves moving thereon, said apparatus comprising:

(a) generally dome-like shell for causing said waves to break, said shell being configured to refract said waves so that the waves after breaking flow along said shell toward a central opening at its apex;

(b) guide vanes secured to said shell for directing said breaking waves into said central opening to induce a downward vortical flow of surface fluid and said material through said central opening;

(c) a standpipe having an inlet end and an outlet end, the inlet end being attached to said shell circumjacent said central opening, the outlet end extending into a region beneath said shell into which said downward flow of fluid and said material is discharged so that said material rises to the top of the fluid beneath said shell, said shell thereby accumulating said material extracted from the surface of said fluid;

(d) diffuser means coupled to said outlet end of said standpipe for diffusing said fluid and said material discharged from said standpipe into said region beneath said shell;

(e) tethering means for securing said shell in a partially submerged position with respect to said fluid surface, said tethering means having one end secured to said diffuser means and the other end securable to a stationary object beneath the surface of said fluid thereby permitting random orientation of said shell;

(f) fin means secured to said shell for providing a selected orientation for said shell with respect to the movement of said waves on the surface of said fluid; and

(g) means providing access through said shell to said region beneath said shell to permit removal of accumulated material from beneath said shell.

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**4,303,521**

**COLUMN FOR THE TREATMENT OF A LIQUID BY MEANS OF A PARTICULATE MATERIAL**

**Hans-Dieter Lehmann, Hechingen, Fed. Rep. of Germany, assignor to Gambro Dialysatoren GmbH & Co KG, Fed. Rep. of Germany**

**Filed Jun. 19, 1980, Ser. No. 161,020**

**Claims priority, application Sweden, Jul. 9, 1979, 7905956**

**Int. Cl.³ B01D *29/08***

**U.S. Cl. 210—282** **18 Claims**

1. A column for treating a liquid with particulate material which comprises first and second layers of sheet material in face-to-face contact with each other, an inlet located at a first point between said first and second layers of sheet material, an outlet located at a second point between said first and second layers of sheet material, joining means for joining said first and second layers of sheet material together in a substantially flat plane and along a pair of substantially parallel paths between said inlet and said outlet so as to form a substantially planar elongated space therebetween, and particulate material contained within said elongated space whereby said liquid may be fed from said inlet to said outlet for contact with said particulate material therebetween.

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**4,303,522**

**CONTINUOUS SEPARATION SYSTEM**

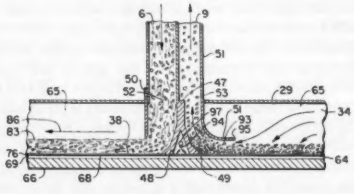
**Joseph C. V. Ducasse, 391 Donegal Pl., Martinez, Calif. 94553**

**Continuation of Ser. No. 906,078, May 15, 1978, abandoned.**

**This application Nov. 21, 1979, Ser. No. 96,363**

**Int. Cl.³ B01D *33/24***

**U.S. Cl. 210—297** **10 Claims**



1. A continuous separation system for separation of solids and liquid contained in a slurry comprising:

means defining a stationary bottom casing;

a horizontal screen assembly disposed above said stationary

bottom casing and mounted for rotation relative thereto about a vertical axis, said screen assembly having a liquid previous portion extending over a predetermined radial range;

means for rotating said screen assembly about said vertical axis;

a stationary scraper disposed above said screen assembly having a radial extent at least commensurate with said radial range;

inlet conduit means proximate said stationary scraper on a first side thereof for depositing a continuous slurry layer on top of said screen assembly over substantially all of said radial range such that substantially the entire liquid pervious portion of said screen assembly is covered with said slurry as said screen assembly rotates relative to said inlet conduit means;

means defining a chamber above said slurry layer;

outlet conduit means having an intake proximate said screen assembly on the opposite side of said stationary scraper from said inlet conduit means; and

means for introducing air into said chamber at a pressure above the pressure in said bottom casing and above the pressure in said outlet conduit means, a first portion of said introduced air passing through said slurry layer to displace liquid and to dry solids therein whereupon a portion of said slurry layer consists of substantially dried solids as it approaches said stationary scraper;

said intake of said outlet conduit means being sized relative to the height of said solids on said screen assembly to receive said solids and to permit a second portion of said introduced air to flow into said outlet conduit means, said second portion entraining said solids, carrying them into said outlet conduit means, and substantially completing the drying thereof while avoiding excessive mechanical handling;

said stationary scraper, said introducing means, and said outlet conduit means defining together means for removing said solids from said screen assembly and carrying said solids out of said chamber devoid of mechanical removal means.

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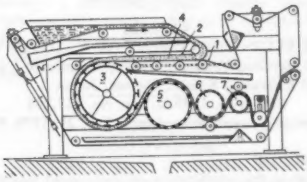
**4,303,523**

## DEWATERING DRUM

**Herbert Ruppnig, Hauptplatz 3, Austria, assignor to Voest-Alpine Aktiengesellschaft, Vienna, Austria**

**Filed Jan. 2, 1980, Ser. No. 109,108**
**Claims priority, application Austria, Jan. 8, 1979, 127/79**
**Int. Cl.³ B01D *33/04***
**U.S. Cl. 210—386** **7 Claims**



1. Dewatering drum for devices for dewatering aqueous suspensions of solid material, in which the aqueous suspension of solid material is passed between sieve belts over at least one rotatable dewatering drum, the sieve belts contacting the dewatering drum over at least part of its circumference, characterized in that the shell of the dewatering drum is water-impermeable and is provided on its circumference with grooves extending approximately in axial direction, said grooves being formed between ribs or straps which comprise on the portions of the circumference of the dewatering drum contacting the sieve band rims extending in opposite direction to the direction of drum rotation, said grooves extending obliquely, relative to the generatrices of the drum shell, in a leading manner with respect to the direction of rotation and in direction to at least one front end of the drum.

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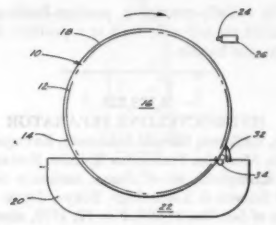
**4,303,524**

## ROTARY VACUUM PRECOAT FILTER

**Thomas E. Richards, Rte. 1, Box 16, Jennings, Fla. 32053; James P. Harvey, 9Hillside Dr., and Michael A. Daigle, Rte. 10, Box 266A, both of Lake City, Fla. 32055**

**Filed May 28, 1980, Ser. No. 153,880**
**Int. Cl.³ B01D *33/06***
**U.S. Cl. 210—406** **10 Claims**



1. In a rotary vacuum precoat filter apparatus for producing a filtered liquid from an incoming solids-containing slurry, the filter apparatus having a rotatable filter drum, a precoat of filter aid material forming a filter cake on an outer surface of the drum, and means for maintaining a differential pressure across the filter aid material to draw filtrate into the drum when the unfiltered slurry is applied to an outer surface of the filter cake, the improvement comprising:

(a) nozzle means for spraying a displacing liquid on an outer surface of the filter cake, said nozzle means being positioned for directing the spray of displacing liquid essentially tangeantially to the filter cake along a direction opposite a rotational direction of the drum; and

(b) supply means connected to the nozzle means for delivering the displacing liquid under pressure to the nozzle, the supply means including temperature-control means for regulating the temperature of the displacing liquid so that the temperature of the sprayed liquid impinging on the filter cake does not cause substantial thermal shock and fracture of the filter cake, said supply means being further operative for supplying the displacing liquid to the nozzle means in a quantity sufficient to enable secondary recovery of filtrate by displacing retained filtrate from the filter cake in to the drum.

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**4,303,525**

## BREWING FUNNEL

**Kenneth W. Stover, Springfield, Ill., assignor to Bunn-O-Matic Corporation, Springfield, Ill.**

**Filed Sep. 14, 1979, Ser. No. 75,601**
**Int. Cl.³ B01D *23/28***
**U.S. Cl. 210—455** **3 Claims**

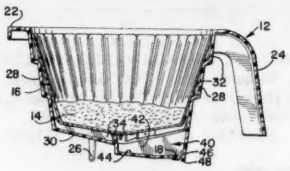
1. A one-piece brewing funnel for beverages, comprising:

a continuous upstanding side wall, a bottom wall and means for supporting a disposable filter above said bottom wall;

said bottom wall comprising a depending wall portion extending radially from the center of said bottom wall to substantially adjacent said side wall and defining a beverage flow channel along the inside surface of said bottom wall communicating with the interior of said funnel, said depending wall portion including a discharge orifice spaced from said center to permit discharge of beverage at selected variable positions by rotation of said funnel;

a handle carried by said side wall, said handle being posi-

tioned on the same side of the funnel as said orifice and generally radially aligned with said orifice; and




a generally radially-extending, position-limiting stop member carried on said side wall at a position diametrically opposite said handle.

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**4,303,526**

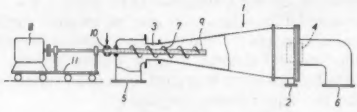
## HYDROCYCLONE SEPARATOR

**Tadao Moro, Ichikawa; Hiroshi Sakamoto, Kawaguchi; Mitsuru Yamamoto, Matsudo; Toshimitsu Kokubo, Komae, and Kaoru Masuda, Kawaguchi, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan**

**Continuation of Ser. No. 11,690, Feb. 12, 1979, abandoned. This application Apr. 9, 1980, Ser. No. 138,666**

**Int. Cl.³ B01D** *21/26, 33/02*

**U.S. Cl. 210—512.3** **3 Claims**




1. A hydrocyclone separator forming a closed end construction including a conical body and a cylindrical portion, and having an inlet provided at the circumference of said cylindrical portion for introducing a slurry of solid material in a liquid tangentially into said cylindrical portion for separation into underflow and overflow slurry fractions, an underflow nozzle connected to the apex terminus of said conical body and an overflow finder mounted on the base end of the cylindrical portion, said separator comprising a forced discharge means in the form of a screw conveyor extending axially through said underflow nozzle into said conical body for forcibly discharging concentrated heavy extraneous slurry components through said underflow nozzle, said screw conveyor being rotatingly driven by a variable speed drive means and having a hollow rotational axis comprising means for providing at least a portion of a passage of air to be fed into said conical body for maintaining an air column therein, said means enabling said passage of air to extend into said conical body a sufficient distance to minimize resistance to the flow of the slurry and to encourage the separating action of the hydrocyclone separator.

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**4,303,527**

## SURGE CONTROL IN THE BIOLOGICAL PURIFICATION OF WASTEWATER

**Hans Reimann, Munich, and Alfred Wildmoser, Haar, both of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany**

**Filed Mar. 10, 1980, Ser. No. 128,350**

**Claims priority, application Fed. Rep. of Germany, Mar. 9, 1979, 2909333**

**Int. Cl.³ C02F** *3/00*

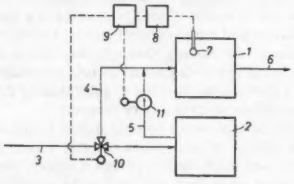
**U.S. Cl. 210—614** **11 Claims**

1. In a process for the biological purification of wastewater wherein the wastewater is treated in a purification plant including at least one storage tank and at least one biological treatment stage, the improvement comprising the steps of:

predetermining a minimum value, an intermediate value, and a maximum value level for at least one of a specific concentration and a concentration-analogous variable of the entering wastewater;

introducing entering wastewater directly into the biological treatment stage when at least one of a specific concentration and a concentration analogous variable of the entering wastewater is equal to said intermediate value level, said intermediate value level corresponding to a normal load on the purification plant;

at least partially introducing entering wastewater into the storage tank when the at least one of a specific concentration and a concentration analogous variable of the entering wastewater exceeds said maximum value level, said maximum value level corresponding to a peak load on the purification plant; and




transferring stored wastewater in the storage tank to the biological treatment stage when the at least one of a specific concentration and a concentration-analogous variable of the entering wastewater is below said minimum value level, said minimum value level corresponding to the peak load on the purification plant having subsided.

5. An apparatus for controlling surges in a wastewater purification plant, comprising: at least one storage tank (2) having an inlet (3) and at least one biological treatment means having an outlet, said biological treatment means in communication with said storage tank, and said inlet (3) of said storage tank (2) comprising a branch conduit (4) connected to a biological treatment stage (1); a measuring device (7) arranged in said biological treatment means for determining the dissolved oxygen of the wastewater therein; and said measuring device (7) connected to regulating and control means (9) for regulating and controlling the flow of wastewater through inlet (3) to the storage tank (2), and the transfer of wastewater from said storage tank (2) into said biological treatment stage (1).

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**4,303,528**

## PURIFICATION TREATMENT OF A LIQUID WASTE

**Daigoro Shibayama, Takasaki, Japan, assignor to Yamato Setsubi Koji Kabushiki Kaisha, Gunma, Japan**

**Filed Feb. 1, 1980, Ser. No. 117,738**

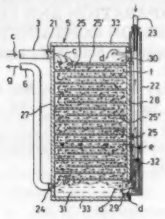
**Claims priority, application Japan, Feb. 21, 1979, 54/19575**

**Int. Cl.³ C02F** *3/06*

**U.S. Cl. 210—615** **5 Claims**

1. A process for purification of foul liquid waste material comprising introducing a mixture of human body waste materials and miscellaneous liquid waste material into a sedimentation tank, causing relatively heavy material to settle within the tank and converting said heavy material into a sludge through anaerobic activity, introducing supernatant foul liquid waste from said sedimentation tank into a submerged bioaeration-beds tank, causing said supernatant foul liquid waste to successively flow in one general horizontal direction, then to flow downwardly vertically, and then to flow in an opposite general horizontal direction in serpentine fashion, said alternate horizontal and vertical flow being effected by positioning in said bioaeration-beds tank a plurality of generally horizontally disposed and alternately foreshortened irrigated sheets in su-

perimposed spaced array, returning foul liquid waste from the bottom of the bioaeration-beds tank to the upper region thereof by an oxygen-containing medium, causing said returned foul liquid waste and said supernatant foul liquid waste to flow together and successively flow on and between said horizontally disposed irrigated sheets, whereby the horizontally and downwardly flowing foul liquid waste is purified by the activity of aerobic micro-organisms in biomembranes formed on said generally horizontally disposed irrigated sheets, and recovering purified liquid from said bioaeration-beds tank.



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**4,303,529**

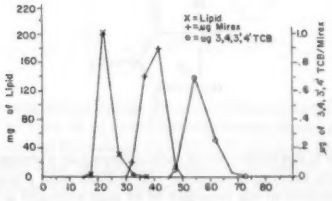
## MULTI-CHROMATOGRAPHIC MATERIALS

**James N. Huckins; David L. Stalling, both of Columbia; Jimmie D. Petty, Harrisburg, and Lawrence M. Smith, Columbia, all of Mo., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.**

**Filed Sep. 8, 1980, Ser. No. 184,851**

**Int. Cl.³ B01D** *15/08*

**U.S. Cl. 210—635** **4 Claims**




1. A process for the one-step separation and analysis of an organic mixture containing planar and nonplanar polynuclear aromatic hydrocarbon compounds comprising passing said mixture through a chromatographic column comprising a multi-chromatographic material consisting essentially of powdered carbon adhered to the surfaces of size exclusion gel particles consisting of a cross-linked copolymer of styrene and divinyl benzene.

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**4,303,530**

## BLOOD FILTER

**Suresh T. Shah, Edina; Miles C. Huffstutler, Jr., and Bruce D. Bentzen, both of Burnsville, all of Minn., assignors to Medical Incorporated, Inver Grove Heights, Minn.**

**Filed Oct. 26, 1977, Ser. No. 845,649**

**Int. Cl.³ B01D** *13/00*

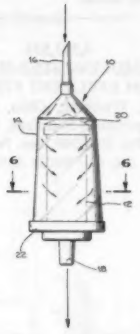
**U.S. Cl. 210—651** **17 Claims**

5. Process for filtering blood comprising:

establishing a blood flow path through a series of porous filter elements from a first element to a last element;

subjecting blood flowing along said blood flow path to passage through generally decreasing pore sizes and generally decreasing filtering volumes, said pore sizes decreasing from a pore size adapted to retain blood debris having particle sizes of at least approximately 90 microns and larger to a pore size adapted to retain blood debris having particle sizes of approximately 20 microns and larger, there being at least three different pore sizes along said blood flow path;

permitting said blood to flow along and through said first element, said first element comprising a knitted fabric structure having a closed stitch pattern on one side and a lay in stitch pattern on one side and a lay in stitch pattern on the opposite side, said blood contacting said lay in stitch pattern first;



permitting said blood to flow through said last element, said last filter element comprising a screen filter element having a pore size of approximately 20 microns; and

at locations along said flow path intermediate said first and last elements, permitting said blood to flow through at least one depth filter and one screen filter.

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**4,303,531**

## METHOD FOR ADSORBING AND RECOVERING PHENOLS

**Nariyoshi Kawabata, Osaka, and Sinichi Yasuda, Otsu, assignors to Koei Chemical Co., Ltd., Osaka, Japan**

**Filed Nov. 27, 1979, Ser. No. 97,674**

**Claims priority, application Japan, Nov. 28, 1978, 53-147624; Oct. 22, 1979, 54-136921**

**Int. Cl.³ B01D** *15/00*

**U.S. Cl. 210—663** **14 Claims**

1. A process for adsorbing and recovering phenols from an aqueous solution thereof, which process comprises:

(a) contacting said solution with a material having as its main component a tertiary-amine-type, anion-exchange resin copolymer of (i) at least one monovinyl pyridine monomer and (ii) at least one vinyl comonomer, said comonomer having a number of ethylenically unsaturated groups, and acting as a crosslinking agent, thereby causing adsorption of phenols onto said material at a high rate, and;

(b) subsequently eluting said material with an eluting agent from which said phenols can be separated by distillation, thereby substantially recovering said phenols, and regenerating said resin.

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**4,303,532**

## DEWATERING OF SLIMES

**Annie G. Smelley, Northport; Robert W. Montgomery, Tuscaloosa, and Bobby J. Hamner, Northport, all of Ala., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.**

**Filed Jul. 12, 1978, Ser. No. 923,837**

**Int. Cl.³ C02F** *1/56*

**U.S. Cl. 210—732** **6 Claims**

1. A process for dewatering of slimes consisting essentially of:

admixing the slimes with an amount of flocculating agent sufficient to effect coagulation of the solids in the slimes,

retaining the slimes-flocculating agent mixture for a time sufficient to form flocs of a size sufficient for moderately rapid settling,

thereafter promptly introducing the resulting mixture of water and flocs into an inclined rotating cylindrical screen, thereby causing dynamic movement of solids, with resulting consolidation of solids, and rapid and simultaneous removal and separation of water, and

separately collecting the resulting water and the dewatered and consolidated solids.

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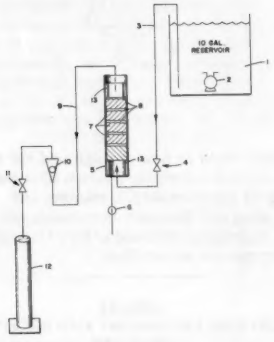
**4,303,533**

## METHOD OF REMOVING FINE SUSPENDED SOLIDS FROM EFFLUENT STREAMS

**Henry A. Fremont, Wyoming, Ohio, assignor to Champion International Corporation, Stamford, Conn.**

**Filed May 30, 1980, Ser. No. 154,800**
**Int. Cl.³ B01D *25/08***
**U.S. Cl. 210—791** **14 Claims**




**7.** The method of removing fine suspended solids from a paper mill secondary effluent comprising passing said effluent through a plurality of contiguous layers of a reticulated polyester polyurethane foam of the Q-type having from about 60 to about 100 pores per lineal inch and compressing said layers when they no longer are capable of removing solids from said effluent to remove solids loaded therein to regenerate said layers, said layers being spaced so that the open-celled pores of each layer are randomly oriented with respect to the pores of each adjacent layer and at least two layers have a different number of pores per lineal inch.

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**4,303,534**

## FOAM FIRE-EXTINGUISHING COMPOSITION AND PREPARATION AND USE THEREOF

**Iwao Hisamoto, Osaka; Chiaki Maeda; Takasige Esaka, both of Kyoto, and Mitsuhiro Nishiwaki, Osaka, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan**

**Filed Oct. 15, 1979, Ser. No. 84,541**
**Claims priority, application Japan, Oct. 14, 1978, 53-126506**
**Int. Cl.³ A62D *1/04***
**U.S. Cl. 252—3** **8 Claims**

**1.** A foam fire-extinguishing composition which comprises a foam fire-extinguishing agent selected from at least one member of the group consisting of a fluorine-containing surfactant, a synthetic surfactant containing no fluorine atom and a partially hydrolyzed protein-containing foaming agent and, as an additive, from 0.2 to 50% by weight based on said fire-extinguishing agent of a water-soluble high molecular compound having not less than several repeating units which contain a fluoroalkyl group and a water-solubilizable group, a molecular weight of not less than 5000 and a fluorine content of not less than 10% by weight and is soluble in water in an amount of at least 0.1% by weight at 25° C. and of which the surface tension is not more than 50 dyn/cm when measured on 0.1 to 5.0% by weight aqueous solution at 25° C.

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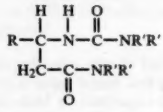
**4,303,535**

## HYDROCARBYL CARBAMIDOPROPANAMIDE, ITS METHOD OF PREPARATION AND LUBRICATING OIL COMPOSITION CONTAINING SAME

**Kechia J. Chou, Wappingers Fall, N.Y., assignor to Texaco Inc., White Plains, N.Y.**

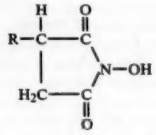
**Filed May 12, 1980, Ser. No. 149,223**
**Int. Cl.³ C10M *1/36***
**U.S. Cl. 252—51.5 A** **19 Claims**

**1.** A hydrocarbyl-substituted carbamidopropanamide represented by the formula:



in which R is a hydrocarbyl radical having an average molecular weight ranging from about 150 to 2000, R' is hydrogen, a hydrocarbyl radical having from 1 to 20 carbon atoms or an $R''—(X—R''')_y—$ radical in which R'' is an alkyl radical having from 1 to 12 carbon atoms, X is oxygen or an NH radical, R''' is a divalent hydrocarbyl radical having from 1 to 3 carbon atoms and y is an integer from 1 to 3.

**11.** A method for preparing a hyrocarbyl-substituted carbamidopropanamide which comprises reacting an N-hydroxy hydrocarbyl-substituted succinimide represented by the formula:

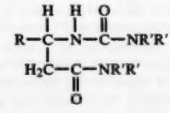


in which R is a hydrocarbyl radical having an average molecular weight ranging from about 150 to 2000, with p-toluene-sulfonyl chloride in the presence of an acid acceptor to produce an intermediate addition reaction product, and reacting said intermediate reaction product with a primary or a secondary amine employing from 2 to 4 moles of said amine per mole of said intermediate reaction product, said amine being represented by the formula:

R'R'NH

in which R' is hydrogen, a hydrocarbyl radical having from about 1 to 20 carbon atoms or an $R''(X—R''')_y$ radical in which R'' is an alkyl radical having from 1 to 12 carbon atoms, X is oxygen or an NH radical, R''' is divalent hydrocarbyl radical having from 1 to 3 carbon atoms and y is an integer from 1 to 3 to produce said hydrocarbyl-substituted carbamidopropanamide.

**13.** A lubricating oil composition comprising a major proportion of a base oil of lubricating viscosity and from 0.1 to about 5 percent by weight of a hydrocarbyl-substituted carbamidopropanamide compound represented by the formula:



in which R is a hydrocarbyl radical having an average molecular weight ranging from about 150 to 2000, R' is hydrogen, a hydrocarbyl radical having from 1 to 20 carbon atoms or an R''—(X—R''')$_y$— radical in which R'' is an alkyl radical having from 1 to 12 carbon atoms, X is oxygen or an NH radical, R''' is a divalent hydrocarbyl radical having from 1 to 3 carbon atoms and y is an integer from 1 to 3.

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**4,303,536**

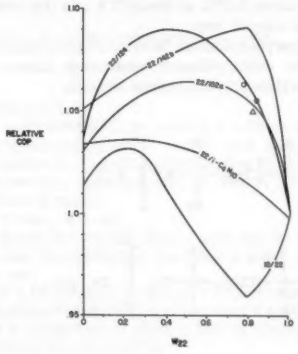
## NONAZEOTROPIC REFRIGERANT COMPOSITION CONTAINING MONACHLORODIFLUOROMETHANE, AND METHOD OF USE

**Sabatino R. Orfeo, Orchard Park; Robert A. Allen, Kenmore; Leonard I. Stiel, Mineola, and John W. Pelava, Buffalo, all of N.Y., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed Dec. 29, 1980, Ser. No. 221,154**

**Int. Cl.$^3$ C09K *5/04***

**U.S. Cl. 252—67** **10 Claims**




1. A nonazeotropic refrigerant composition comprising from about 99 to 1 wt. % of monochlorodifluoromethane, as a first component, and from about 1 to 99 wt. % of a polar fluorocarbon selected from the group consisting of 2-chloro-1,1,1,2-tetrafluoroethane and 1,1-difluoroethane, as a second component.

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**4,303,537**

## WATER BASED LUBRICANT

**Werner Laepple, Karlsfeld, and Gisela Wienert, Munich, both of Fed. Rep. of Germany, assignors to Dow Corning GmbH, Munich, Fed. Rep. of Germany**

**Filed Oct. 9, 1979, Ser. No. 83,041**

**Claims priority, application Fed. Rep. of Germany, Nov. 15, 1978, 2849617**

**Int. Cl.$^3$ C10M *3/18***

**U.S. Cl. 252—30** **5 Claims**

1. A stable aqueous lubricant composition which contains

(a) about 60 to 80 percent by weight water,

(b) 15 to 30 percent by weight of a combination of molybdenum disulfide, having a particle size in the range of 1 to 5 inclusive and graphite in the weight ratio of 1.5:1 to 2.5:1,

(c) 5 to 10 percent of a binder which is a hard, air drying polymer of an alkyl ester of methacrylic or acrylic acid in which the alkyl group contains 1 to 4 carbon atoms, (a), (b) and (c) combined giving 100 percent by weight,

(d) about 0.1 to 2 percent by weight of a dispersing and/or wetting agent, and

(e) about 0.1 to 1 percent by weight of a water soluble thickening agent, the weights of (d) and (e) both being based on the total weight of (a), (b) and (c).

**4,303,538**

## GREASE COMPOSITIONS AND OXYALUMINUM ACYLATE INTERMEDIATE COMPOSITIONS USEFUL IN THE PREPARATION THEREOF

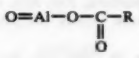
**Charles E. Pratt, Signal Mountain, and Charles S. Colburn, Jr., Lookout Mtn., both of Tenn., assignors to Chattem, Inc., Chattanooga, Tenn.**

**Filed Nov. 4, 1980, Ser. No. 201,273**

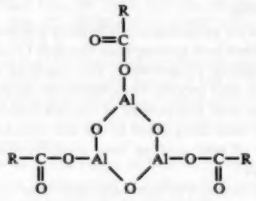
**Int. Cl.$^3$ C10M *5/14, 7/20*; C07F *5/06***

**U.S. Cl. 252—37.7** **25 Claims**

1. Compounds of the formula



and of the formula



wherein R is selected from the group of radicals consisting of:

Type (A): aliphatic radicals each containing from 10 to 38 carbon atoms, and

Type (B): aromatic radicals each containing from 6 to 16 carbon atoms, and

wherein, in any given group of such compounds, the mole percent of said Type (B) radicals ranges from 75 to 95% and the balance up to 100 mole percent thereof is said Type (A) radicals.

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**4,303,539**

## OIL ADDITIVES CONTAINING A THIOCARBAMYL MOIETY

**Won R. Song, Short Hills, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.**

**Continuation of Ser. No. 74,821, Sep. 12, 1979, abandoned. This application Dec. 19, 1980, Ser. No. 218,446**

**Int. Cl.$^3$ C10M *1/38***

**U.S. Cl. 252—47** **2 Claims**

1. A composition comprising a lubricating oil containing 0.01 to 20 weight percent of a thiocarbamyl derivative of an allylicly unsaturated polyisobutenyl isothiocyanate, the polyisobutenyl having a number average molecular weight of 1,200 to 5,000, said derivative being formed by reaction of said polyisobutenyl isothiocyanate with an alkylene polyamine having 2 to 60 carbon atoms.

2. The composition of claim 1 wherein said alkylene polyamine is an ethylene polyamine having 2 to 4 ethylene groups.

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**4,303,540**

## COOLING, LUBRICATING AND CLEANING AGENT

**Dietrich Schuster, Am Kaefernberg 7, 6741 Frankweilier, Pfalz, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 913,848, Jun. 8, 1978, Pat. No. 4,226,734. This application May 14, 1980, Ser. No. 149,727**

**Claims priority, application Fed. Rep. of Germany, Dec. 22, 1977, 2757322**

**The portion of the term of this patent subsequent to Oct. 7, 1997, has been disclaimed.**

**Int. Cl.$^3$ C10M *1/06***

**U.S. Cl. 252—49.3** **8 Claims**

1. A cooling, lubricating, and cleaning agent, comprising the

agent formed by the condensation reaction of an excess aminoalcohol with boric acid, and the adding of an oxaethane carboxylic acid to the boron containing complex diamine formed in the reaction system.

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**4,303,541**

## PROCESS FOR CHARGING A LATENT HEAT STORAGE DEVICE WITH A SALT HYDRATE COMPOSITION

**Joachim Wasel-Nielen, Hirschberg; Karl Merkenich, Rimbach, both of Fed. Rep. of Germany; Oskar Gehrig, deceased, late of Dannstadt, Fed. Rep. of Germany (by Ralf Buettner, heir), and Klaus Sommer, Heidelberg, Fed. Rep. of Germany, assignors to Benckiser-Knapsack GmbH Ladenburg, Ladenburg, Fed. Rep. of Germany**

**Filed Sep. 18, 1980, Ser. No. 188,352**

**Claims priority, application Fed. Rep. of Germany, Sep. 20, 1979, 2937959**

**Int. Cl.³ C09K** *5/06;* **F24H** *7/00;* **F24J** *3/02*

**U.S. Cl. 252—70** **13 Claims**

1. A process for preparing a salt hydrate composition having a phase transition heat greater than the heat capacity of water at a corresponding temperature, for charging a latent heat storage device, said process comprising the steps of:

providing an acid component of the salt hydrate;

providing a base component of the salt hydrate, wherein at least one of said acid or base components comprises a liquid; and

mixing said acid component and said base component together to cause a neutralization reaction, said acid and base components being mixed in a ratio and in respective concentrations to produce a salt hydrate solution saturated at the desired phase transition point.

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**4,303,542**

## POWDERED DETERGENT OR SOAK

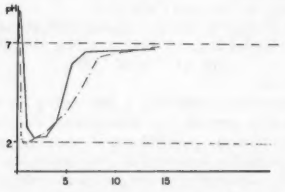
**Karl H. Heinlein, Alte Bahnhofstr. 33, and Joachim Busch, Postr. 6, both of 6490 Schluchtern, Fed. Rep. of Germany**

**Filed Jul. 13, 1979, Ser. No. 57,202**

**Claims priority, application Fed. Rep. of Germany, Apr. 23, 1979, 2916416**

**Int. Cl.³ C11D** *3/08, 3/15, 11/00, 17/02*

**U.S. Cl. 252—91** **10 Claims**




1. Powdered detergent or soak particularly for use in one of a preliminary and main washing cycle of household machines and laundry machines for washing in a phosphate-free wash liquor, which detergent forms with water an acid wash liquor with a pH of 1–4, and contains one or more solid or pseudo-solid acids, in addition to wash-active substances, characterized in that the detergent contains powdered portions, by means of which the acid wash liquor is neutralized or alkalized substantially or completely by itself within a period of about 2 to 25 minutes, and that these portions comprise one or more alkali-supplying substances from the group: sodium metasilicate, soda, water-glass, calcium oxide, magnesium oxide, magnesium oxychloride, calcium carbonate and magnesium carbonate, which substances are at least partly coated with one of a film that dissolves in the acid wash liquor and a non-ionic surfactant, wherein the detergent or soak specifically includes as at least part of the alkali supplying substance 8–25% by weight magnesium carbonate, 1–13% by weight magnesium oxide and 0–20% by weight calcium carbonate.

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**4,303,543**

## METHOD FOR CLEANSING AND CONDITIONING THE SKIN

**Samir A. Mansy, Mason, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation of Ser. No. 15,838, Feb. 27, 1979, abandoned. This application Jul. 23, 1979, Ser. No. 59,708**

**Int. Cl.³ C11D** *9/30, 9/48*

**U.S. Cl. 252—117** **13 Claims**

1. A method of cleansing and conditioning the skin comprising the steps of:

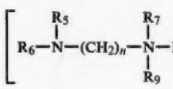
1. Applying to the skin a composition comprising;

a. from about 3% to about 95% by weight of a soap selected from the group consisting of alkali metal salts of fatty acids containing from about 8 to about 20 carbon atoms and mixtures of said soaps; and

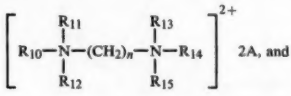
b. from about 0.25% to about 25% of a skin conditioning agent selected from;

I. Stearylammonium laurate, stearylammonium stearate, distearyldimethylammonium laurate and distearyldimethylammonium stearate,

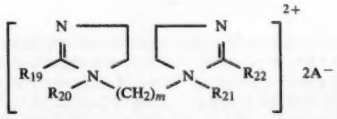
II




III




IV




wherein $R_5$, $R_6$, $R_7$, $R_8$ and $R_9$ are each selected from the group consisting of hydrogen and aliphatic hydrocarbyl groups containing from 1 to about 24 carbon atoms with at least one of $R_5$, $R_6$, $R_7$, $R_8$ and $R_9$ being an aliphatic hydrocarbyl group containing from about 8 to about 24 carbon atoms, wherein $R_{10}$, $R_{11}$, $R_{12}$, $R_{13}$ $R_{14}$ and $R_{15}$ are each selected from the group consisting of hydrogen and $C_1$ to $C_{24}$ aliphatic hydrocarbyl groups with at least one of $R_{10}$, $R_{11}$, $R_{12}$, $R_{13}$, $R_{14}$ and $R_{15}$ being an aliphatic hydrocarbyl group containing from about 8 to about 24 carbon atoms, wherein $R_{19}$, $R_{20}$, $R_{21}$ and $R_{22}$ are each selected from the group consisting of hydrogen and aliphatic hydrocarbyl groups containing from 1 to about 24 carbon atoms, with at least one of $R_{19}$, $R_{20}$, $R_{21}$ and $R_{22}$ being an aliphatic hydrocarbyl group containing from about 8 to about 24 carbon atoms, wherein n is an integer of from 1 to about 20, wherein m is an integer of from 2 to about 20 and wherein A is an anion which is selected from the group consisting of the anions of fatty acid soaps and anionic synthetic detergents; wherein the weight ratio of soap to conditioning agent is from about 3:1 to 100:1 and wherein said composition is substantially free of synthetic detergents; and

2. Rinsing the skin with water.

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## ADDUCTS OF ALCOHOLS AND OLEFIN OXIDES AS BIODEGRADABLE AND LOW-FOAMING TENSIDES USEFUL IN DETERGENTS

Kurt Kosswig, and Ekkehard Wienhoefer, both of Marl, Fed. Rep. of Germany, assignors to Chemische Werke Huels, A.G., Marl, Fed. Rep. of Germany

Filed May 5, 1980, Ser. No. 146,918

Claims priority, application Fed. Rep. of Germany, May 4, 1979, 2918047

The portion of the term of this patent subsequent to Nov. 24, 1998, has been disclaimed.

Int. Cl.[3] C07C *41/02, 43/10;* C11D *1/722, 3/075*

U.S. Cl. 252—174.21 18 Claims

1. A biodegradable and low-foaming tenside of the formula (I) or (II)

$$R[O-(CH-CHO)_x-(CH_2CH_2O)_y-H]_m \quad (I)$$

(R′ and R″)

or

$$R[O[-(CH-CHO)_x-(CH_2CH_2O)_y-]-H]_m \quad (II)$$

(R′ and R″)

wherein when m is 2,

R is $C_{8-22}$-divalent alkyl, or when m is 1, R is $C_{8-22}$ alkyl or $C_{2-22}$ hydroxyalkyl; and R′ and R″ each independently is hydrogen or $C_1$–$C_{20}$-alkyl provided that R′ and R″ are not simultaneously hydrogen, and R′ and R″ in total have 8–20 carbon atoms;

x is 0.5–5 and y is 5–50;

"---" indicates that the individual x units and the individual y units may be attached to the other x and y units in any order; and

m is 1 or 2 for formula (I) and m is 1 for formula (II).

16. A detergent composition comprising a tensile effective amount of a compound of claim 1 and an adjuvant conventional in detergent compositions.

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## HOT ROLL CLEANING PASTE AND METHOD

Robert S. Cutler, and Robert M. Lindquist, both of Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 19, 1980, Ser. No. 151,485

Int. Cl.[3] C11D *1/72, 3/14, 7/02*

U.S. Cl. 252—174.21 6 Claims

1. A cleaning paste comprising a mixture of about 71% by weight polyethoxylated t-octyl phenol 9–10 mole EtO, about 22% by weight diatomaceous earth, and about 7% by weight colloidal pyrogenic silica pigment.

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4,303,546

## PROCESS OF TREATING AQUEOUS HEATING MEDIA IN HEATING SYSTEMS, AND COMPOSITION

Rolf R. Waegerle, Ladenburg, Fed. Rep. of Germany, assignor to Benckiser-Knapsack GmbH, Ludwigshafen am Rhein, Fed. Rep. of Germany

Continuation of Ser. No. 25,562, Apr. 3, 1970, abandoned. This application Jul. 26, 1974, Ser. No. 492,249

Claims priority, application Fed. Rep. of Germany, Apr. 5, 1969, 1917686

Int. Cl.[3] C02F *5/10, 5/12, 5/14*

U.S. Cl. 252—180 18 Claims

1. A process for treating an aqueous medium in a heating system used for the heat treatment of containers, comprising the step of adding to the aqueous heating medium in said heating system a scale- and corrosion-suppressing composition comprising:

(a) A phosphonic acid compound selected from the group consisting of diethylene triamino penta-(methylene phosphonic acid), nitrilo tris-(methylene phosphonic acid), propylene diamino tetra-(methylene phosphonic acid), ethylene diamino tetra-(methylene phosphonic acid), and alkali metal salts thereof, and

(b) a polyhydroxy acid component selected from the group consisting of gluconic acid and its salts,

the proportion of phosphonic acid compound to polyhydroxy acid compound in said composition being between about 3:1 and about 1:3, and the amounts of scale- and corrosion-suppressing composition added to the heating system being between about 0.1 g. and about 100 g. for 100 liters of aqueous heating medium.

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4,303,547

## LUMINESCENT MATERIAL

James M. Brownlow, Crompond, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 28, 1979, Ser. No. 107,946

Int. Cl.[3] C09K *11/30;* C03C *3/28*

U.S. Cl. 252—301.4 F 3 Claims

1. A $Cu^+$ and $Al^{+3}$ activated luminescent material exhibiting emission in the wavelength range of 380 to 570 nanometers with a peak in the blue color range when excited by 245 nanometer mercury light consisting of the fired product of the three following ingredients:

silicon dioxide in the range of 84.6 to 99.76 mol %

cuprous oxide in the range of 0.08 to 0.85 mol % and

$Al_2O_3$ in the range of 0.12 to 15 mol %.

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## PROCESS FOR COATING DISPERSED MINUTE DROPLETS WITH MEMBRANE

Tetsuro Shimazaki, and Shun Kamei, both of Tokyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Jun. 28, 1979, Ser. No. 52,926

Claims priority, application Japan, Jul. 5, 1978, 53-81793

Int. Cl.[3] B01J *13/02*

U.S. Cl. 252—316 7 Claims

1. A process for coating dispersed minute droplets with membrane by polycondensation, which comprises mixing together a solvent containing a nonionic emulsifier and a solvent substantially insoluble in the former solvent, thereby forming a dispersion of minute droplets, the dispersion medium of the dispersion being a water-containing solvent and the nonionic emulsifier being present in an amount of 15% by weight or less based on the dispersion; adding one or more organic acids soluble in said dispersion; adding urea and formaldehyde to said dispersion; adding an aromatic polyol to said dispersion; and effecting polycondensation to form membrane around the dispersed droplets in said dispersion.

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4,303,549

## LIQUID DEFOAMER AND DEFOAMING PROCESS

Francis J. Boylan, Newton, N.J., assignor to Drew Chemical Corporation, Boonton, N.J.

Continuation-in-part of Ser. No. 85,781, Oct. 18, 1979, abandoned. This application Mar. 31, 1980, Ser. No. 135,478

Int. Cl.[3] B01D *19/04*

U.S. Cl. 252—321 28 Claims

1. A pumpable free flowing aqueous defoaming composition which can be stored in a ready to use form, comprising:

(a) water;

(b) at least one solid alcohol having from 14 to 28 carbon atoms;

(c) at least one solid fatty acid;

(d) at least one soap of a solid fatty acid, said components (b), (c) and (d) being present in the water in an effective defoaming amount and to provide a dispersed solids content in the water of at least 5%;

(e) a surfactant comprised of at least one member selected

from the group consisting of non-ionic surfactants and anionic surfactants selected from the group consisting of:
alcohol sulfates
alkaryl sulfonates
ethoxylated alcohol sulfates
sulfates and sulfonates of ethoxylated alkyl phenols
sulfates of fatty esters
sulfates and sulfonates of alkyl phenols
sulfonates of condensed naphthalenes
sulfonates of naphthalene
sodium derivatives of sulfo-succinates
alkali salts of petroleum sulfonates
alkali phosphate esters
sulfonated alkyl esters
sodium polymeric carboxylic acid

which surfactant prevents formation of a gelled mass of the solids to provide a pumpable free flowing dispersion of the solids in the water, said dispersed solids having been treated with at least one water soluble salt selected from the group consisting of calcium, iron, magnesium, barium and aluminum salts to provide hydrophobic surfaces.

**23**. A process for defoaming in an aqueous system, comprising:

adding to the aqueous system an effective defoaming amount of a composition as defined in claim **1**.

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**4,303,550**

## METHODS FOR THE REGENERATION OF DEACTIVATED PHOSPHOMOLYBDIC ACID BASED CATALYSTS

**James L. Callahan, Wooster; Wilfrid G. Shaw, and Arthur F. Miller, both of Lyndhurst, all of Ohio, assignors to Standard Oil Company, Ohio**

**Filed Dec. 28, 1979, Ser. No. 107,989**
**Int. Cl.³ B01J *27/28;* C07C *51/25, 57/055***
**U.S. Cl. 252—413** **25 Claims**

**12**. A method for the regeneration of deactivated phosphomolybdic acid based catalysts comprising the steps of:

imbibing a substantially anhydrous alkyl alcohol having from one to about five carbon atoms within the pore structure of said deactivated catalyst so as to form a fluid phase within the pore structure;

adding a volatile acid to said fluid phase;

adding a volatile base to said fluid phase to form a precipitate; and

drying and calcining said precipitate to yield a regenerated catalyst.

**13**. A method for the regeneration of phosphomolybdic acid based catalysts comprising the steps of:

imbibing an aqueous volatile base within the pore structure of said deactivated catalyst so as to form a fluid phase within the pore structure;

adding a volatile acid, selected from the group consisting of hydrochloric, hydrobromic, hydroiodic, organic carboxylic acids and halogenated carboxylic acids having from 1 to about 4 carbon atoms, to said fluid phase so as to form a precipitate; and

drying and calcining said precipitate to yield a regenerated catalyst.

**14**. A method for the regeneration of deactivated phosphomolybdic acid based catalysts comprising the steps of:

imbibing a volatile solvent within the pore structure of said deactivated catalyst so as to form a fluid phase within the pore structure;

adding a volatile acid, selected from the group consisting of hydrochloric, hydrobromic, hydroiodic, organic carboxylic acids and halogenated carboxylic acids having from 1 to about 4 carbon atoms, to said fluid phase

adding a volatile base to said fluid phase to form a precipitate; and

drying and calcining said precipitate to yield a regenerated catalyst.

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**4,303,551**

## SUPPORTED CATALYST

**Ronald J. Vaughan, Orinda, Calif., assignor to Varen Technology, Marshallton, Del.**

**Continuation-in-part of Ser. No. 970,475, Dec. 18, 1978, abandoned, Ser. No. 660,634, Feb. 23, 1976, and Ser. No. 132,149, Mar. 20, 1980, which is a continuation-in-part of Ser. No. 970,474, Dec. 18, 1978, abandoned. This application May 30, 1980, Ser. No. 155,797**
**Int. Cl.³ B01J *31/06***
**U.S. Cl. 252—430** **15 Claims**

**1**. A process of preparing a supported, infusible, substantially insoluble, catalyst of a perfluorocarbon polymer containing pendant acid groups, which comprises:

first, coating a solid substrate with a thin film of an intermediate perfluorocarbon polymer containing pendant groups which are convertible to acid groups having an equivalent weight of at least 900,

and second, converting only the surface layer of said pendant groups of said intermediate in said coating into acid groups, thereby obtaining a composite of said infusible, substantially insoluble acid polymer catalyst bound to said supporting substrate by unconverted polymer.

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## DIESEL EXHAUST CATALYST

**Michael V. Ernest, Baltimore, and William A. Welsh, Clarksville, both of Md., assignors to W. R. Grace & Co., New York, N.Y.**

**Filed May 27, 1980, Ser. No. 153,502**
**Int. Cl.³ B01J *21/04, 21/06, 23/64***
**U.S. Cl. 252—465** **24 Claims**

**1**. A composition comprising a mixture of catalytically-effective amounts of a supported material comprising a noble metal and chromium or catalytically-active compounds thereof, said material supported on a porous refractory inorganic oxide, and at least one bulk material selected from the group consisting of an element of the first transition series, silver, hafnium, and catalytically-active compounds thereof, said mixture deposited on a substrate.

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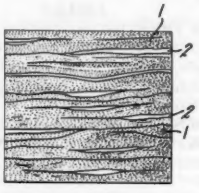
**4,303,553**

## NEUTRON-PROTECTION HEAT INSULATING MATERIAL

**Susumu Aoki, Yokohama; Hirosi Asaumi, Kamakura; Shigeo Take, Yokohama; Junichi Miyakoshi, Tokyo; Hiroshi Takemoto, Fujisawa, and Kenta Kabayama, Yokohama, all of Japan, assignors to Nippon Asbestos Co., Ltd. and Japan Nuclear Ship Research and Development Agency, both of Tokyo, Japan**

**Filed Sep. 28, 1978, Ser. No. 946,570**
**Int. Cl.² G21F *1/06;* G21C *11/06***
**U.S. Cl. 252—478** **14 Claims**




**1**. A neutron-protection heat insulating material comprising:

(a) a unidirectionally compressed sheet-like structure containing chrysotile asbestos fibers having a diameter of about 0.1 microns and having a density of from about 0.2 to about 1.0 g/cm$^3$;

(b) a boron-containing compound in the amount of from

about 5 to about 40 percent by weight of the sheet-like structure; and

(c) said sheet-like structure containing a plurality of substantially flat air spaces having substantially greater dimensions normal to the direction of compression than parallel thereto.

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**4,303,554**

## COMPOSITION AND PROCESS FOR PRODUCING TRANSPARENT CONDUCTIVE FILM

**Ryoichi Sudo, Yokosuka; Masaaki Okunaka, Fujisawa; Hitoshi Yokono, Yokohama; Tokio Isogai, Fujisawa, and Mitsuo Yamazaki, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Chemical Company, Ltd., both of Tokyo, Japan**

**Filed Jun. 19, 1980, Ser. No. 161,028**

**Claims priority, application Japan, Jun. 22, 1979, 54-78215**

**Int. Cl.³ H01B *1/06***

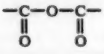
**U.S. Cl. 252—518** **27 Claims**

7. A composition for forming a transparent electroconductive film comprising

(A) an indium salt selected from the group consisting of a chloride, a nitrate and perchlorate of indium and a hydrate thereof,

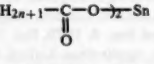
(B) a polybasic carboxylic acid having 2 to 5 carboxyl groups in the molecule and having 12 or less carbon atoms, or

(B') a polybasic carboxylic acid anhydride having 1 or more bonds of the formula:



in the molecule and having 12 or less carbon atoms,

(C) a tin compound selected from the group consisting of a tin compound of the formula:



in which n is an integer of 17 or less and a tin halide, and

(D) a solvent for dissolving (A), (B) or (B') and (C);

the molar ratio of B/A over B'/A=0.1 to 5.0/1, the ratio of the tin compound/(the indium salt plus the tin compound)=5 to 15% by mole, and a total of A+B or B'+C is 2 to 50% by weight and D is 50 to 98% by weight.

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## USE OF MIXTURE OF ALIPHATIC $C_{10}$ BRANCHED OLEFINS IN AUGMENTING OR ENHANCING THE AROMA OF PERFUMES, AND/OR PERFUMED ARTICLES

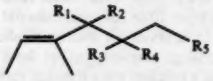
**Richard M. Boden, Monmouth Beach; Lambert Dekker, Wyckoff; Frederick L. Schmitt, Holmdel, all of N.J., and Augustinus G. Van Loveren, Rye, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 160,788, Jun. 19, 1980, Pat. No. 4,287,084. This application Sep. 18, 1980, Ser. No. 188,576**

**Int. Cl.³ A61K *7/46***

**U.S. Cl. 252—522 R** **3 Claims**

1. A process for augmenting or enhancing the aroma of a consumable material selected from the group consisting of perfume compositions and colognes comprising the step of adding to a perfume composition or a cologne base, an aroma augmenting or enhancing quantity of a composition of matter consisting essentially of compounds produced by reacting two moles of diisoamylene with each other in the presence of an acid catalyst, thereby producing at least one compound defined according to the generic structure:



wherein, $R_1$, $R_2$, $R_3$, $R_4$ and $R_5$ represent hydrogen or methyl with the provisos that (i) at least one of $R_3$ and $R_4$ represents methyl; (ii) the sum of the carbon atoms in each of $R_1$, $R_2$, $R_3$, $R_4$ and $R_5$ is 3; and (iii) $R_1$ and $R_2$ each represent hydrogen when $R_5$ is methyl.

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**4,303,556**

## SPRAY-DRIED DETERGENT COMPOSITIONS

**Ramon A. Llendado, West Chester, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 847,983, Nov. 2, 1977, Pat. No. 4,180,485. This application Dec. 10, 1979, Ser. No. 102,212**

**The portion of the term of this patent subsequent to Dec. 25, 1996, has been disclaimed.**

**Int. Cl.³ C02F *1/42*; C11D *3/12, 3/33, 11/02***

**U.S. Cl. 252—527** **10 Claims**

1. A granular detergent composition comprising:

(1) from about 5% to about 40% of a water-soluble organic surface active agent selected from the group consisting of anionic, nonionic, zwitterionic, and ampholytic detergents;

(2) from about 10% to about 60% of a finely divided aluminosilicate ion exchange material selected from the group consisting of:

(a) crystalline aluminosilicate material of the formula:

$$Na_z[(AlO_2)_z.(SiO_2)_y.xH_2O$$

wherein z and y are at least 6, the molar ratio of z to y is from 1.0 to 0.5 and x is from 10 to 264, said material having a particle size diameter of from about 0.1 micron to about 10 microns, a calcium ion exchange capacity of at least about 200 mg. $CaCO_3$ eq./g. and a calcium ion exchange rate of at least about 2 grains $Ca^{++}$/gallon/minute/gram;

(b) amorphous hydrated aluminosilicate material of the empirical formula

$$M_z(zAlO_2.ySiO_2)$$

wherein M is sodium, potassium, ammonium, or substituted ammonium, z is from about 0.5 to about 2, y is 1 and said material has a magnesium ion exchange capacity of at least about 50 milligram equivalents of $CaCO_3$ hardness per gram of anhydrous aluminosilicate and a $Mg^{++}$ exchange rate of at least about 1 grain/gallon/minute/gram/gallon and

(c) mixtures thereof;

(3) from about 3.5% to about 15% of an alkali metal oxide silicate solid having a weight ratio of $SiO_2$:alkali metal oxide of from about 1.4:1 to about 2.0:1, and

(4) from about 0.5 to about 20% of a water-soluble salt of nitrilotriacetic acid,

said granular detergent having been prepared by mixing the above components with water to form a slurry, and then removing water from the slurry by drying.

7. A process for producing crisp, free-flowing detergent granules comprising the steps of:

(1) forming an aqueous slurry comprising:

(a) from about 3.5% to about 30% of a water-soluble organic surface active agent selected from the group consisting of anionic, nonionic, zwitterionic, and ampholytic detergents;

(b) from about 7% to about 45% of a finely divided aluminosilicate ion exchange material selected from the group consisting of:

(1.1) crystalline aluminosilicate material of the formula:

$$Na_z[(AlO_2)_z.(SiO_2)_y.xH_2O$$

wherein z and y are at least 6, the molar ratio of z to y is from 1.0 to 0.5 and x is from 10 to 264, said material having a particle size diameter of from about 0.1 micron to about 10 microns, a calcium ion exchange capacity of at least about 200 mg. $CaCO_3$ eq./g. and a calcium ion exchange rate of at least about 2 grains $Ca^{++}$/gallon/minute/gram;

(1.2) amorphous hydrated aluminosilicate material of the empirical formula:

$$M_z(zAlO_2.ySiO_2)$$

wherein M is sodium, potassium, ammonium, z is from about 0.5 to about 2, y is 1 and said material has a magnesium ion exchange capacity of at least about 50 milligram equivalents of $CaCO_3$ hardness per gram of anhydrous aluminosilicate and a $Mg^{++}$ exchange rate of at least about 1 grain/gallon/minute/-gram/gallon; and

(1.3) mixtures thereof;

(c) from about 2.5% to about 15% of an alkali metal oxide silicate solid having a weight ratio of $SiO_2$:alkali metal oxide of from about 1.4:1 to about 2.0:1;

(d) from about 0.4% to about 15% of a water-soluble salt of nitrilotriacetic acid; and

(e) from about 25% to about 50% water; (2) drying the slurry to form crisp, free-flowing detergent granules.

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## ABRASION RESISTANT SPRAY DRIED ALUMINOSILICATE DETERGENT COMPOSITION

**Terence J. Rose, Tervuren, Belgium, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation of Ser. No. 853,674, Nov. 21, 1977, abandoned, which is a continuation of Ser. No. 631,030, Nov. 11, 1975, Pat. No. 4,072,621. This application Sep. 23, 1980, Ser. No. 189,869**

**Claims priority, application United Kingdom, Nov. 13, 1974, 49174/74**

**The portion of the term of this patent subsequent to Feb. 7, 1995, has been disclaimed.**

**Int. Cl.³ C02F *1/42;* C11D *3/12, 3/37, 11/02***

**U.S. Cl. 252—527** **13 Claims**

1. A spray-dried granular detergent composition capable of rapidly reducing the free polyvalent metal ion content of an aqueous solution, comprising:

(a) from about 5% to about 65% by weight of a water-insoluble hydrated metallo-silicate ion exchange material of a formula

$$M_z[(MeO_2)_z.(SiO_2)_y]\ xH_2O$$

wherein M is an alkali metal ion, Me is aluminum; the molar ratio of z to y is in the range from about 0.8 to about 1.0, and x is an integer from about 15 to about 264, said metallo-silicate ion exchange material having a particle size diameter of from about 0.1 micron to about 10 microns; a calcium exchange capacity of at least about 200 mg.$CaCO_3$ eq./g.; and a calcium ion exchange rate of at least about 2 grains $Ca^{++}$/gallon/minute/gram;

(b) from about 5% to about 65% by weight of an organic surface active agent selected from the group consisting of anionic and nonionic surface-active agents and mixtures thereof; said anionic surface-active agents being selected from the group consisting of water-soluble salts of sulfates or sulfonates of reaction products having an alkyl group containing from about 8 to 22 carbon atoms and mixtures thereof; said nonionic surface active agents being selected from the group consisting of condensation products of synthetic fatty alcohols having from about 12 to about 16 carbon atoms with an average of about 4 to about 9 moles of ethylene oxide and the condensation product of tallow fatty alcohol with 11 moles of ethylene oxide and mixtures thereof; and

(c) from about 0.10% to about 6% by weight of a water-soluble derivative of a copolymer of

(1) a vinyl compound having the general formula RCH=CHR wherein one R represents a hydrogen atom and the other R represents an alkyl ether radical containing one carbon atom, and

(2) maleic anhydride;

the ratio of (1) to (2) being 2:1 to 1:2; the anhydride form of the maleic anhydride-vinyl alkyl ether copolymer having a specific viscosity (defined by measuring the viscosity of the solution of one gram of said anhydride form in 100 cc methylethylketone in a Cannon-Fenske Series 100 viscosity meter at 25° C.) ranging from 0.1 to 6.0;

(d) from about 0.5% to about 3% alkali metal silicate solids having a molar ratio of $SiO_2$/alkali $metal_2O$ in the range from about 0.5 to about 4.0.

3. The composition in accordance with claim 1 wherein the surface-active agent is present in an amount from about 10% to about 50% by weight.

4. The composition in accordance with claim 3 which in addition contains from about 5% to about 50% by weight of an auxiliary builder salt selected from the group consisting of sodium tri-polyphosphate, sodium carbonate, sodium bicarbonate, sodium citrate, sodium oxydisuccinate, sodium mellitate, sodium nitrilotriacetate, sodium ethylenediaminetetraacetate, sodium polymaleate, sodium polyitaconate, sodium polymesaconate, sodium polyfumarate, sodium polyaconitate, sodium polycitraconate, sodium polymethylenemalonate sodium carboxymethyloxymalonate, sodium carboxymethyloxysuccinate, sodium ciscyclohexanehexacarboxylate, cis-cyclopentanetetracarboxylate, and sodium phloroglucinol trisulfonate.

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**4,303,558**

## CLEANING COMPOSITION COMPRISING 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE AND AN ALCOHOL

**David G. Hey, Northwich, England, assignor to Imperial Chemical Industries Limited, London, England**

**Filed Sep. 4, 1979, Ser. No. 72,171**

**Claims priority, application United Kingdom, Sep. 15, 1978, 36980/78; Nov. 13, 1978, 44220/78**

**Int. Cl.³ C11D *7/52, 3/44, 3/32***

**U.S. Cl. 252—548** **13 Claims**

1. A cleaning composition comprising the approximate azeotropic mixture of 1,1,2-trichloro-1,2,2-trifluoroethane and a lower aliphatic alcohol and containing a cleaning-improving amount of an N-substituted or N,N-disubstituted amide of an aliphatic carboxylic acid wherein there is at least one hydroxyalkyl or hydroxyalkenyl substituent of up to 8 carbon atoms attached to the amide nitrogen atom.

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**4,303,559**

## PROCESS FOR THE REUTILIZATION OF PAINT SLUDGES

**Sergio Trost, Volvera, Italy, assignor to Centro Ricerche Fiat S.p.A., Orbassano, Italy**

**Filed Apr. 18, 1980, Ser. No. 141,532**

**Claims priority, application Italy, May 16, 1979, 68035 A/79**

**Int. Cl.³ C08J *11/04***

**U.S. Cl. 260—2.3** **14 Claims**

1. A process for reclaiming aqueous paint sludge containing at least one synthetic thermosetting resin, which comprises the steps of:

(a) breaking the sludge into particles to obtain distinct, semi-solid fragments, of a size not exceeding 1 cm,

(b) drying these fragments without substantially reducing the thermosetting properties of the resin present therein, to obtain dried fragments having a weight loss not greater than 20% after a heat treatment at 105° C. for 2 hours,

(c) grinding the dried fragments to obtain ground particles of a size not exceeding 0.6 mm,

(d) compacting the particles to obtain a coherent, porous, gas-permeable solid, and

(e) heating the solid to a temperature, and for a time, sufficient to agglomerate the particles and at least partially thermoset the resin contained in said particles.

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**4,303,560**

## RUBBERY POLYMER COMPOSITION

**Kohki Takahashi; Takeo Kondoh, both of Sagamihara; Masao Koga, Machida, and Kenichiro Nishiwaki, Ichihara, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 16, 1979, Ser. No. 94,951**

**Claims priority, application Japan, Mar. 17, 1979, 54/31590; Mar. 17, 1979, 54/31591**

**Int. Cl.³ C08F** *8/00, 210/02;* **C08L** *23/00*

**U.S. Cl. 260—4 R** **8 Claims**

1. A rubbery polymer composition consisting essentially of a crosslinkable copolymer of Type II:

Type II

15 to 55 wt. parts of a vinyl carboxylate having the formula (I); 5 to 20 wt. parts of ethylene; an alkyl acrylate having the formula (II'); an alkoxyalkyl acrylate having the formula (II) (100 wt. parts of a total of said four components and more than 0.8 of a ratio of the alkoxyalkyl acrylate (II) to the alkyl acrylate (II') by weight); 0 to 5 wt. parts of the components having the formula (III), (IV) or (V):

(I): $RCOO\text{-}CH{=}CH_2$

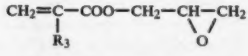
wherein R represents a $C_{1-4}$ alkyl group

(II): $CH_2{=}CHCOO{-}R_1O{-}R_2$

wherein $R_1$ represents a $C_{1-4}$ alkylene group; and $R_2$ represents a $C_{1-4}$ alkyl or alkoxyalkyl group

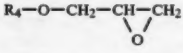
(II'): $CH_2{=}CHCOO{-}R_6$

wherein $R_6$ represents a $C_{3-8}$ alkyl group



(III)

wherein $R_3$ represents hydrogen atom or methyl group



(IV)

wherein $R_4$ represents vinyl, allyl or methallyl group

(V): $CH_2{=}CH{-}O{-}R_5$

wherein $R_5$ represents $CH_2Cl{-}CH_2{-}$ or $CH_2Cl{-}CO{-}$ group.

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**4,303,561**

## MELAMINE RESINS: PROCESS FOR THEIR MANUFACTURE AND THE COMPRESSION MOULDING COMPOSITIONS PRODUCED FROM THE MELAMINE RESINS

**Steffen Piesch, Oberursel, and Alfons Wolf, Seligenstadt, both of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Fechenheim, Fed. Rep. of Germany**

**Filed May 29, 1979, Ser. No. 42,976**

**Claims priority, application Fed. Rep. of Germany, Jun. 3, 1978, 2824473**

**Int. Cl.³ C08G** *12/30;* **C08L** *1/10*

**U.S. Cl. 260—15** **8 Claims**

1. Partially etherified melamine-formaldehyde resin with a melamine:formaldehyde molar ratio of 1:(1.25 to 1).

8. In an aminoplast compression moulding composition having a resin:filler ratio of 1:(0.42 to 3) the improvement comprises said resin being the resin according to claim 1.

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## LIGNIN-CONTAINING RESIN ADHESIVE

**John W. Hollis, Jr., Schofield, and Michael W. Schoenherr, Wausau, both of Wis., assignors to American Can Company, Greenwich, Conn.**

**Filed Jul. 24, 1980, Ser. No. 171,795**

**Int. Cl.³ C08G** *8/28;* **C08L** *97/00*

**U.S. Cl. 260—17.5** **10 Claims**

1. A method for producing a lignin-phenol-formaldehyde resin which comprises the steps of:

(1) reacting a mixture of phenol and formaldehyde in the presence of sodium hydroxide catalyst under reflux conditions for a period sufficient to produce a partially condensed phenol-formaldehyde resin;

(2) forming a mixture of the partially condensed phenol-formaldehyde resin with sodium hydroxide, formaldehyde and a lignin concentrate solution having at least 40% solids comprising normally water-insoluble and phenol-insoluble alkali lignin dissolved in a solvent selected from the group consisting of (a) phenol and water, and (b) phenol, water and sodium hydroxide or ammonia; the lignin to phenol weight ratios in said solutions being less than 70:30 and more than 40:60; and

(3) reacting said mixture to form a lignin-phenol-formaldehyde resin.

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**4,303,563**

## COATING, IMPREGNATING AND ADHESIVE COMPOSITIONS CURABLE AT AMBIENT TEMPERATURE

**William D. Emmons, 1411 Holcomb Rd., Huntingdon Valley, Pa. 19006, and Wayne E. Feely, 1172 Lindsay La., Rydal, Pa. 19046**

**Continuation-in-part of Ser. No. 965,673, Jan. 1, 1978, and a continuation-in-part of Ser. No. 865,568, Dec. 29, 1977, abandoned. This application Dec. 3, 1979, Ser. No. 99,673**

**Int. Cl.³ C08F** *18/24, 26/08*

**U.S. Cl. 260—23 AR** **39 Claims**

1. A composition, suitable for coating, impregnating, and/or bonding purposes and adapted to be cured under ambient conditions, comprising a liquid vehicle containing:

(1) A soluble vinyl addition polymer of monoethylenically unsaturated monomers, said polymer containing a plurality of primary or secondary amine groups and/or aldimine or ketimine groups pendant from spaced mers or polymer units in the polymer chain,

(2) At least one compound having at least two acryloxy groups of the formula

$H_2C{=}C(H)C(O){-}O{-}$

and

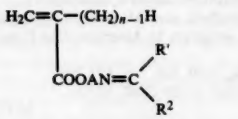
(3) Optionally when component (1) is a polymer containing only primary and/or secondary amine groups, a volatile ($C_3$–$C_{10}$) ketone or ($C_3$–$C_{10}$) aldehyde stabilizer which retards the reaction of (1) and (2) under ambient conditions,

wherein component (1) comprises at least one of:

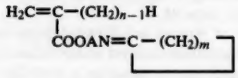
(a) An amidation product of a vinyl addition copolymer of a mixture of monoethylenically unsaturated monomers containing a lower alkyl (meth)acrylate with a polyamine having at least two amino groups selected from primary and secondary amino groups and having their nitrogen atoms attached to aliphatic carbon atoms,

(b) A ketimine or aldimine derivative of (a) obtained by reaction of primary amine groups in (a) with a ($C_3$–$C_{10}$) ketone or a ($C_3$–$C_{10}$) aldehyde, and

(c) A soluble vinyl addition copolymer of a monomer having a general formula H-I, H-II, H-III or E-I, these formulas being as follows:

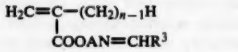


(H-I)



(H-II)

and



(H-III)

where

m is an integer having a value of 4 to 5,

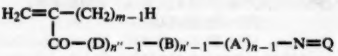
n is an integer having a value of 1 to 2,

A is a $C_2$–$C_{12}$ alkylene group,

R′ is a ($C_1$–$C_{12}$) alkyl or cycloalkyl group,

$R^2$ is a ($C_1$–$C_{12}$) alkyl or cycloalkyl group, and

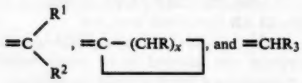
$R^3$ is selected from the group consisting of phenyl, halophenyl, and alkoxypheny! in which the alkoyl group has one to four carbon atoms, and



(E-I)

wherein:

Q is selected from the group consisting of



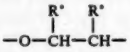
R is H or it may be methyl in one CHR unit,

$R^1$ is selected from the group consisting of ($C_1$–$C_{12}$) alkyl and cyclohexyl groups,

$R^2$ is selected from the group consisting of ($C_1$–$C_{12}$) alkyl and cyclohexyl groups,

$R^3$ is selected from the group consisting of phenyl halophenyl, ($C_1$–$C_{12}$) alkyl, cyclohexyl, and ($C_1$–$C_4$) alkoxyphenyl groups,

A′, B, and D are the same or different oxyalkylene groups having the formula



R° being individually selected from the group consisting of H and alkyl radicals having 1 to 2 carbon atoms,

m is an integer having a value of 1 to 2,

x is an integer having a value of 4 to 5,

n is an integer having a value of 1 to 200,

n′ is an integer having a value of 1 to 200,

n″ is an integer having a value of 1 to 200, the sum of n-1, n′-1, and n″-1 having a value of 2 to 200,

the relative amount of (2) to (1), based respectively on acryloxy unsaturation equivalency of (2) and amine (primary and/or secondary) nitrogen equivalency of (1), being such as to provide at least from 0.5 to 3.5 equivalents of (2) for each equivalent of (1).

**4,303,564**

## PROCESS FOR STABILIZING VINYLIDENE CHLORIDE RESINS

**Nobuaki Kuroshima, Nobeoka, and Koichi Mashiki, Hyugo, both of Japan, assignors to Asahi-Dow Limited, Tokyo, Japan**

**Filed Feb. 28, 1980, Ser. No. 125,410**

**Claims priority, application Japan, Mar. 27, 1979, 54-35079**

**Int. Cl.³ C08K *3/32, 5/11, 5/15***

**U.S. Cl. 260—23 XA** **10 Claims**

1. A process for stabilizing a vinylidene chloride containing resin which comprises adding to 100 parts by weight of a vinylidene chloride copolymer from about 0.0005 to about 0.2 parts by weight per 100 parts by weight of the vinylidene chloride copolymer of Vitamin E, from about 0.0005 to about 0.2 parts by weight per 100 parts by weight of the vinylidene chloride copolymer of an alkyl ester of thiodipropionic acid having 12 to 18 carbon atoms in the alkyl groups thereof, and from about 0.0005 to about 0.2 parts by weight per 100 parts by weight of the vinylidene chloride copolymer of a phosphate selected from the group consisting of an alkali metal salt or an alkali earth metal salt of a phosphoric acid.

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**4,303,565**

## COMPOSITION COMPRISING ESTER OF EPOXY, UNSATURATED FATTY ACID DIMER OR TRIMER AND ACID CONTAINING ADDITION POLYMER, AND AQUEOUS COATING COMPOSITIONS PREPARED THEREFROM

**Michael A. Tobias, Bridgewater, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Aug. 29, 1980, Ser. No. 182,746**

**Int. Cl.³ C08L *63/10***

**U.S. Cl. 260—23 CP** **8 Claims**

1. A stable aqueous emulsion comprising an adduct containing carboxyl groups and substantially free of oxirane groups, which adduct is the esterification reaction product of

(a) an acidic addition copolymer comprising a solution copolymer of alpha, beta monoethylenically unsaturated monomers containing at least 10 weight percent of alpha, beta monoethylenically unsaturated carboxylic acid monomer based on the total weight of the monomers; and

(b) a partially defunctionalized epoxy resin containing free epoxide groups, which is the reaction product of polyepoxide and a dimer or trimer of an unsaturated fatty acid containing 12 to 24 carbon atoms;

in which at least a portion of the carboxyl groups in said adduct are reacted with base to render the composition self-emulsifiable in water.

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**4,303,566**

## TRANSPARENT THERMOPLASTICS CONTAINING ORGANOSILICON COMPOUNDS

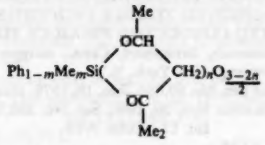
**Robert E. Kalinowski, Auburn, and Gary A. Vincent, Midland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Filed Jun. 30, 1980, Ser. No. 164,112**

**Int. Cl.³ C08J *3/18;* C08K *5/15;* C08L *83/04***

**U.S. Cl. 260—29.1 SB** **7 Claims**

1. A clear thermoplastic selected from the group consisting of polyvinyl chloride, polystyrene, polycarbonate, polyacrylates, polyethylene terephthalate and polybutylene terephthalate containing from 0.1 to 20 percent by weight based on the weight of the thermoplastic of a siloxane containing at least 25 percent by weight phenyl radicals and having an average composition



in which m is 0 to 0.5 and n is 0.4 to 1.

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**4,303,567**

## PROCESS FOR THE PRODUCTION OF THINLAYER POLYESTER COATINGS

**Walter Frank; Otto Bendszus; Hansjoachim Freier, and Hans-Joachim Traenckner, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jun. 5, 1980, Ser. No. 156,552**

**Claims priority, application Fed. Rep. of Germany, Jun. 8, 1979, 2923338**

**Int. Cl.³ C08J *3/00*; C08L *00/00*; C08K *00/00***

**U.S. Cl. 260—29.2 UA** **6 Claims**

1. A process for the production of a thin-layer coating, characterized in that a monomer-free aqueous dispersion of at least one $\alpha,\beta$-ethylenically unsaturated polyester containing from 0.2 to 0.8 mole of $\beta,\gamma$-ethylenically unsaturated ether groups per 100 g of polyester, is polymerized in the presence of an accelerator, but in the absence of a standard external polymerization initiator.

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**4,303,568**

## CORROSION INHIBITION TREATMENTS AND METHOD

**Roger C. May, Glenside, and Gary E. Geiger, Philadelphia, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.**

**Filed Dec. 10, 1979, Ser. No. 101,658**

**Int. Cl.³ C08L *31/02, 33/02***

**U.S. Cl. 260—29.6 MP** **46 Claims**

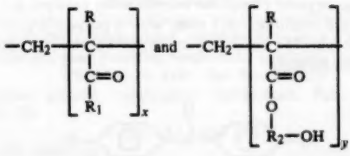
1. A method of inhibiting the corrosion of ferrous metal parts in contact with an aqueous solution with little or no attendant deposition of scale on said ferrous parts, which corrosion inhibition is obtained by providing for the formation of a protective passive oxide film on the metal surface in contact with said aqueous medium, which method comprises

(i) assuring that the pH of said aqueous medium is 5.5 or above;

(ii) assuring that the aqueous medium contains a calcium or other appropriate ion concentration selected from the group consisting of zinc, nickel and chromium and mixtures thereof; and

(iii) adding to said aqueous medium

(a) a water-soluble polymer comprising moieties derived from an acrylic acid or water-soluble salt thereof and moieties of an hydroxylated lower alkyl acrylate, wherein the moieties of the polymer having the following formulas:



wherein R is hydrogen or a lower alkyl of from 1 to 3 carbon atoms; $R_1$ is OH, OM or $NH_2$ where M is a water-soluble cation; $R_2$ is a lower alkyl of from about 2 to 6 carbon atoms and the mole ratio of x:y is 34:1 to 1:4; and

(b) a water-soluble orthophosphate compound; said polymer being such that together with the orthophosphate compound is effective to promote the metal oxide film with no attendant deposition, and the amount of (a) and (b) being added being sufficient to provide a substantially scale-free protective passive oxide film on the metallic surface.

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**4,303,569**

## COAGULATION OF LATEX

**Nur Güurak, and Klaas Tebbens, both of Sarnia, Canada, assignors to Polysar Limited, Sarnia, Canada**

**Filed Dec. 5, 1979, Ser. No. 100,297**

**Claims priority, application Canada, Jul. 19, 1979, 332147**

**Int. Cl.³ C08J *3/16***

**U.S. Cl. 260—29.7 PT** **8 Claims**

1. An improved process for the coagulation of an aqueous latex of a rubbery $C_4$–$C_6$ conjugated diolefin-containing polymer which comprises contacting a stream of said latex with an aqueous stream of a coagulant solution and separating, recovering and drying the coagulated polymer, characterized in that the latex and coagulant solution are contacted in a tubular coagulation means at a temperature of from about 50° to about 80° C. for a time of from about 1 to about 30 seconds, a Reynolds Number of from about 7,000 to about 70,000 and a flow ratio, by weight, of coagulant solution to the polymer content of the latex of from about 150:1 to about 750:1, said tubular coagulation means being disposed at an angle of from about 20° up to about 90° to the horizontal plane and being of narrow diameter elongate form, having a coagulant solution feed line attached at or close to one terminal point, having a latex feed line attached at or close to said terminal point to one or more lines located essentially centrally within said tubular coagulation means, said one or more lines being of not more than about 25% of the cross-sectional area of the tubular coagulation means and terminating within said tubular coagulation means allowing the latex to pass into the coagulant solution at a point downstream of but closely adjacent to the point at which the coagulant solution feed line is attached, said tubular coagulation means terminating in essentially unrestricted form above and feeding into one end of a conduit inclined at a small angle from the horizontal sufficient to allow the coagulated mixture to flow down said conduit to the opposite exit end thereof where said conduit is equipped, at a distance from the end thereof of not more than 1.5 times the maximum diameter of said tubular coagulation means, with an impingement plate which the coagulated mixture contacts, following which the coagulated polymer is separated, recovered and dried.

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**4,303,570**

## COMPOSITION FOR FABRICATING SUPERPLASTICALLY FORMED/DIFFUSION BONDED STRUCTURES

**Edward D. Weisert, Rolling Hills Estates, and Suphal P. Agrawal, Torrance, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Division of Ser. No. 936,982, Aug. 25, 1978, Pat. No. 4,220,276. This application Feb. 22, 1980, Ser. No. 123,627**

**Int. Cl.³ C08K *5/10***

**U.S. Cl. 260—31.2 R** **14 Claims**

1. A stopoff composition for fabricating a metallic structure from a plurality of metal blanks by superplastic forming and diffusion bonding, to prevent bonding in preselected areas, which comprises as essential component yttria having a particle size greater than 5 microns, and an inert organic liquid vehicle for said yttria, said organic vehicle comprising a binder capable of volatilizing and leaving substantially no organic residue at elevated temperature below the diffusion bonding temperature of said metal blanks.

4,303,571

## FILM-FORMING THERMOPLASTIC ELASTOMERIC POLYMER COMPOSITIONS

Deborah S. Jansen, East Windsor, and Robert C. Puydak, East Orange, both of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Jan. 17, 1980, Ser. No. 112,179
Int. Cl.[3] C08K 5/01
U.S. Cl. 260—33.6 AQ 13 Claims

1. A film-forming thermoplastic elastomeric blend composition consisting essentially of a blend of:

(a) about 25 to 55 parts by weight of an EPM or EPDM elastomer having an ethylene content of from about 55 to 70 weight percent;

(b) about 35 to 55 parts by weight of a thermoplastic ethylene-vinyl acetate copolymer having a vinyl acetate content of about 9 to 40% by weight; and

(c) about 15 to 25 parts by weight of a normally liquid hydrocarbon process oil, the oil being an aromatic, highly aromatic, naphthenic or paraffinic process or extender oil, the blend composition containing at least 4.5% by weight vinyl acetate based upon the total weight of the blend composition and the blend composition having a melt index at 190° C. of about 0.5 to 15 gm./10 min.

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4,303,572

## CURABLE COMPOSITION

Masayuki Hatanaka, Oura, and Atsushi Kurita, Ohta, both of Japan, assignors to Toshiba Silicone Co., Ltd., Tokyo, Japan

Filed Sep. 15, 1980, Ser. No. 187,276
Claims priority, application Japan, Sep. 20, 1979, 54-121403
Int. Cl.[3] C08G 77/12; C08L 83/06
U.S. Cl. 260—37 SB 13 Claims

1. A curable composition consisting essentially of:

(A) 100 parts by weight of polyorganosiloxane containing at least 2 vinyl radicals bonded to silicon atom(s) in the molecule,

(B) 0.1 to 10 parts by weight of polyorganohydrogensiloxane containing more than 2 hydrogen atoms bonded to silicon atom(s), on the average, in the molecule,

(C) 5 to 500 parts by weight of fine, tungsten, powder, and

(D) a catalytic amount of a platinum catalyst containing no halogen atoms in the molecule.

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4,303,573

## MOLDING BLENDS COMPRISING POLYESTER, IONOMER RESIN AND GRAFTED EPDM

George J. Ostapchenko, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 7, 1981, Ser. No. 223,212
Int. Cl.[3] C08L 67/02, 23/26
U.S. Cl. 260—40 R 8 Claims

1. A molding blend consisting essentially of

(a) polyethylene terephthalate,

(b) 2 to 20% by weight of blend of an ionomeric terpolymer consisting of 60 to 99% by weight ethylene, 0.5 to 20% by weight methacrylic acid, and 0.5 to 20% by weight isobutyl acrylate, in which the acid moieties are neutralized to the extent of 5 to 100% with divalent metallic cations,

(c) 2 to 20% by weight of blend of a second terpolymer of 60 to 90% by weight ethylene, 10 to 38% by weight propylene, 2 to 10% by weight 1,4-hexadiene and 0 to 5% by weight 2,5-norbornadiene which has 0.2 to 9% by weight succinic groups appended to the terpolymer chain.

4,303,574

## HEAT RESISTANT ETHYLENE-PROPYLENE RUBBER WITH IMPROVED TENSILE PROPERTIES AND INSULATED CONDUCTOR PRODUCT THEREOF

Joseph E. Vostovich, Bridgeport, Conn., assignor to General Electric Company, New York, N.Y.

Continuation of Ser. No. 50,036, Jun. 19, 1979, abandoned. This application Nov. 20, 1980, Ser. No. 208,725
Int. Cl.[3] C08K 9/06
U.S. Cl. 260—42.15 6 Claims

1. A curable ethylene-propylene rubber composition having improved tensile and related physical properties, resistance to heat and apt electrical and physical properties, consisting essentially of the combination in approximate parts by weight of:

| | |
|---|---|
| Ethylene-propylene rubber | 100 |
| Talc-hydrated magnesium silicate | 50–125 |
| Vinyl silane | 0.5–3 |
| Thermal carbon black | 10–32 |
| Reaction product of acetone and diphenylamine | 1–2.5 |
| Zinc salt of 2-mercaptotolylimidazole | 0.2–3 |
| Chlorosulfonated polyethylene | 3–10 |
| Antimony trioxide | 3–10 |
| Zinc oxide | 15–25 |
| Dicumyl peroxide curing agent | 2–8 |
| Polybutadiene homopolymer | 2–5 |

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4,303,575

## FLAME RETARDANT POLYCARBONATE COMPOSITIONS

Gerard E. Reinert, McMurray, Pa., assignor to Mobay Chemical Corporation, Pittsburgh, Pa.

Filed Feb. 7, 1980, Ser. No. 119,248
Int. Cl.[3] C08K 5/09, 5/42
U.S. Cl. 260—45.8 A 11 Claims

1. In a flame retardant polycarbonate comprised of a polycarbonate resin and a perfluoroalkane sulfonate salt, the improvement comprising an effective amount of a halogenated aromatic carboxylic anhydride to impart improved flame retardancy to said polycarbonate.

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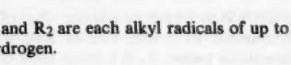
4,303,576

## STABILIZED POLYESTER COMPOSITIONS

Roy J. Jackson, Jr., Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 30, 1980, Ser. No. 164,208
Int. Cl.[3] C08K 5/18
U.S. Cl. 260—45.9 QB 7 Claims

1. A stabilized composition comprising (1) an ethylenically unsaturated polyester prepared by first esterifying an epoxy compound selected from the group consisting of glycidyl novolac resins glycidyl polyethers of polyhydric phenols and glycidyl polyethers of hydrogenated polyhydric phenols with an ethylenically unsaturated monocarboxylic acid in the presence of an organic phosphine esterification catalyst and then reacting the resulting vinyl ester with a polycarboxylic acid anhydride and (2) a stabilizing amount of a secondary amine of the general formula



wherein $R_1$ and $R_2$ are each alkyl radicals of up to 12 carbon atoms or hydrogen.

4,303,577

## POLYAMIDE ANTIOZONANTS

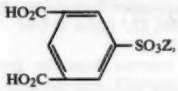
James S. Ridgway; Donald A. Holmer, and Oscar A. Pickett, Jr., all of Pensacola, Fla., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 965,634, Dec. 1, 1978, abandoned. This application Nov. 16, 1979, Ser. No. 95,865

Int. Cl.[3] C08K 5/42

U.S. Cl. 260—45.75 C 7 Claims

1. A polyamide fiber having incorporated therein as an antiozonant a reaction product produced by reacting at least one 5-sulfoisophthalic acid of the formula



where Z is hydrogen, ammonia or an alkali metal, with at least one water soluble copper salt, wherein the amount of said reaction product incorporated in said fiber is an amount sufficient to provide from about 10 to about 100 parts per million of copper, based on the weight of the polyamide.

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4,303,578

## ORGANO-ANTIMONY COMPOUNDS

Klaus-Peter Michaelis, Lindenfels, Fed. Rep. of Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

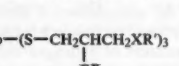
Filed Mar. 27, 1980, Ser. No. 134,725

Claims priority, application Switzerland, Apr. 3, 1979, 3091/79

Int. Cl.[3] C08K 5/59

U.S. Cl. 260—45.75 B 9 Claims

1. An organo-antimony compound of the formula I



(I)

wherein R is hydrogen or $C_1$–$C_{18}$acyl, R′ is $C_1$–$C_{20}$alkyl or $C_1$–$C_{18}$acyl, and X is sulfur or oxygen.

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4,303,579

## VINYL ESTER RESINS HAVING IMPROVED COLOR

Roy J. Jackson, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jul. 7, 1980, Ser. No. 166,431

Int. Cl.[3] C08K 5/13

U.S. Cl. 260—45.95 E 10 Claims

1. A storage-stable, curable vinyl ester resin exhibiting improved color prepared by esterifying a glycidyl polyether of a polyhydricphenol with an ethylenically unsaturated monocarboxylic acid in the presence of a stabilizer composition comprising (1) from about 50 to about 250 ppm of hydroquinone, (2) from about 50 to about 500 ppm of a sterically hindered phenol and paratoluenesulfonic acid.

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4,303,580

## METAL CASEINATES

Jaime Hidalgo; Valentin Wenner, and Francoise Forni, all of La Tour-de-Peilz, Switzerland, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed Feb. 6, 1980, Ser. No. 119,022

Claims priority, application Switzerland, Feb. 9, 1979, 12697/79

Int. Cl.[3] A23J 1/20

U.S. Cl. 260—113 5 Claims

1. A process for preparing a soluble caseinate of at least one oligo-element containing, for n times 100 grams of casein, from 3 to 100 milli-ion-grams of $M^{n+}$, where M represents the oligo-element(s) and n is an integer, comprising treating an alkali metal caseinate, in solution with a solution of a salt of the oligo-element(s), washing the caseinate thus formed by at least one of ultrafiltration diafiltration and dialysis until the caseinate has a substantially constant composition, and dissolving the caseinate in water to form micelles.

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4,303,581

## WATER DISPERSED PRIMER-SURFACER COMPOSITION

Morris Levine, Cleveland Heights; Michael Yurcheshen, Parma Heights, and Roland W. Hight, Brookpark, all of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jul. 16, 1980, Ser. No. 169,237

Int. Cl.[3] C08L 91/00, 61/28

U.S. Cl. 260—18 PF 14 Claims

1. A water-based composition, adapted for use as a primer-surfacer for application to a metallic substrate prior to application of an acrylic lacquer or enamel, characterized in that the film forming or binder ingredients dissolved or dispersed in aqueous solvent include a combination of three distinct types of separately prepared resinous film forming components as follows:

(A) an addition copolymer prepared by the polymerization in aqueous emulsion of a monomer mixture of (1) at least 40 percent by weight of a styrenic monomer (2) from 2 to 8 percent by weight of a hydroxyl functional monomer having a

addition polymerizable group (3) from 1 to 6 percent by weight of a carboxyl functional monomer having a

addition polymerizable group and (4) any remainder of other acrylic monomers having a

polymerizable group, said addition copolymer being present as prepared in aqueous latex form, and the proportion of said addition copolymer being from 50 to 90 weight percent of the total film forming ingredients;

(B) water compatible epoxy ester resin in a proportion of 5 to 40 weight percent of the total film-forming ingredients and

(C) water soluble or dispersible aminoplast resin in a proportion of 5 to 20 weight percent of the total film forming ingredients.

4,303,582

## SPRAY DRYING PROCESS FOR PREPARATION OF SOLID SODIUM AMOXYCILLIN

David H. S. Shean, Cranleigh, and John R. Steel, Newdigate, both of England, assignors to Beecham Group Limited, England

Continuation of Ser. No. 962,196, Nov. 20, 1978, abandoned, which is a continuation of Ser. No. 887,837, Mar. 7, 1978, abandoned, which is a continuation of Ser. No. 822,259, Aug. 5, 1977, abandoned. This application May 23, 1980, Ser. No. 152,711

Claims priority, application United Kingdom, Aug. 10, 1976, 33176/76

Int. Cl.[3] C07D *499/18*

U.S. Cl. 260—239.1 3 Claims

1. A process for the preparation of solid sodium amoxycillin of improved stability and purity which comprises subjecting a solution consisting of from 5% to 25% by weight sodium amoxycillin in aqueous isopropanol wherein the initial weight ratio in the solution of isopropanol to sodium amoxycillin, which solution has been cooled to from 5° to −10° C., to spray drying at an inlet temperature of from 155° to 200° C. and an outlet temperature of from 95° to 110° C., with a retention time of from 1 to 2 seconds.

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4,303,583

## 1H,5H-[1,4]THIAZEPINO[4,3-a]INDOLE-1,5-DIONES

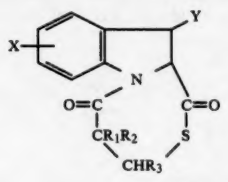
Dong H. Kim, Wayne, and Ronald J. McCaully, Malvern, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 65,817, Aug. 13, 1979. This application Jul. 1, 1980, Ser. No. 164,992

Int. Cl.[3] C07D *513/04*

U.S. Cl. 260—239.3 T 14 Claims

1. A compound of the formula:



wherein:

$R_1$ is hydrogen, lower alkyl, aryl, or aralkyl;

$R_2$ is hydrogen or lower alkyl;

$R_3$ is hydrogen, lower alkyl, or aroyl;

X is hydrogen, hydroxy, lower alkyl, lower alkoxy or halogen; and

Y is hydrogen, lower alkyl, or aryl, wherein aryl is phenyl or phenyl substituted by a halogen, lower alkyl, lower alkoxy, or hydroxy group; aralkyl is benzyl or benzyl substituted on the phenyl ring by a halogen, lower alkyl, lower alkoxy, or hydroxy group; and aroyl is benzoyl or benzoyl substituted as above for phenyl.

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4,303,584

## METHOD OF PREPARING VINCRISTINE

Homer L. Pearce, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Apr. 2, 1980, Ser. No. 136,616

Int. Cl.[3] C07D *519/04*

U.S. Cl. 260—244.4 5 Claims

1. The process for preparing vincristine which comprises oxidizing a solution of vinblastine sulfate at a temperature in the range about −20° C. to about −40° C. with an acidic ferrous salt-hydrogen peroxide oxidizing mixture, making the reaction mixture strongly basic, extracting therefrom the vincristine thus produced with an organic solvent and then isolating the vincristine.

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4,303,585

## 3-OXA-BICYCLO (3,1,0)-HEXAN-2-ONE INTERMEDIATES

Jacques Martel, Bondy; Jean Tessier, Vincennes; Andre Teche, Nanterre, and Jean-Pierre Demoute, Montreuil-sous-Bois, all of France, assignors to Roussel Uclaf, Paris, France

Division of Ser. No. 973,791, Dec. 28, 1978, Pat. No. 4,273,727. This application Feb. 6, 1981, Ser. No. 232,118

Claims priority, application France, Jan. 31, 1978, 78 02621

Int. Cl.[3] C07D *307/93*

U.S. Cl. 260—343.3 R 1 Claim

1. A compound selected from the group consisting of (1RS,5S) 6,6-dimethyl-4(R)-[(S)-cyano-(3'-phenoxyphenyl)-methoxy]-3-oxa-bicyclo-(3,1,0)-hexan-2-one and (1R,5S) 6,6-dimethyl-4(R)-[(R)-cyano-(3'-phenoxyphenyl)-methoxy]-3-oxa-bicyclo-(3,1,0)-hexan-2-one and mixtures thereof.

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4,303,586

## CATALYTIC EPOXIDATION OF OLEFINS

Jean-Pierre Schirmann, Oullins, and Serge Y. Delavarenne, Francheville le Haut, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Courbevoie, France

Division of Ser. No. 872,947, Jan. 27, 1978, abandoned. This application May 11, 1979, Ser. No. 38,182

Claims priority, application France, Feb. 1, 1977, 77 02748; Oct. 28, 1977, 77 32584

Int. Cl.[3] C07D *301/12*

U.S. Cl. 260—348.31 11 Claims

1. A method for the epoxidation of olefins by hydrogen peroxide which comprises reacting in a liquid phase an olefin with an anhydrous solution of hydrogen peroxide in organic solvent, substantially inert with respect to reagents and epoxide formed, said solvent being in a concentration sufficient to maintain a single liquid phase under reaction conditions, at a temperature between about 0° C. and 120° C. in the presence of a catalyst selected from $B_2O_3$ or metaboric acid, which is able to act as a catalyst for the reaction or to generate such a catalyst and is able to remove water from the reaction mixture, in an amount from about 0.5 mole to 10 moles per mole of hydrogen peroxide.

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4,303,587

## CATALYTIC EPOXIDATION OF OLEFINS

Jean-Pierre Schirmann, Oullins, and Serge Y. Delavarenne, Francheville le Haut, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Courbevoie, France

Continuation of Ser. No. 872,947, Jan. 27, 1978, abandoned. This application Sep. 7, 1979, Ser. No. 73,440

Claims priority, application France, Feb. 1, 1977, 77 02748; Oct. 28, 1977, 77 32584

Int. Cl.[3] C07D *301/12*

U.S. Cl. 260—348.31 15 Claims

1. A method of epoxidation of olefins by hydrogen peroxide at a temperature between 0° C. and 120° C. in a liquid phase which comprises, reacting an olefin and hydrogen peroxide in the presence of a catalyst selected from boron oxide or boron oxyacid catalysts, used in an amount of 0.0001 mole to 1 mole of catalyst per mole of hydrogen peroxide, continuously eliminating water introduced with the hydrogen peroxide as well as the water formed in the course of the reaction, from the reaction mixture by distillation during the course of the reaction, and recovering the epoxidized olefin.

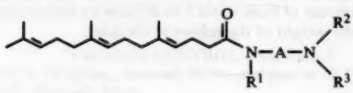
4,303,588

## FARNESYLACETIC ACID AMIDES

Susumu Okabe, Kyoto; Yoshiaki Omura, Okayama; Yoichi Ninagawa, and Yoshiji Fujita, both of Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Mar. 21, 1980, Ser. No. 132,408
Claims priority, application Japan, Mar. 28, 1979, 54-37585
Int. Cl.³ C11C *3/00*; A61K *31/16*; C07D *211/22*
U.S. Cl. 260—404.5 10 Claims

1. A farnesylacetic acid amide compound of the formula



(I)

wherein A is a straight or branched alkylene group having from 2 to 10 carbon atoms,

$R^1$ is a hydrogen atom or a lower alkyl group, and

$R^2$ and $R^3$ are the same or different and each is a hydrogen atom, $C_1$–$C_{10}$ alkyl, $C_5$ or $C_6$ cycloalkyl, methylcyclohexyl, $C_2$–$C_{15}$ alkenyl, phenyl, tolyl, xylyl, benzyl or phenethyl,

or either of $R^2$ and $R^3$ forms, together with A, a piperidine or pyrrolidine ring which contains the nitrogen atom lying therebetween,

or $R^2$ and $R^3$ form, together with the adjacent nitrogen atom a piperidine, pyrrolidine piperazine or N-methylpiperazine ring; and pharmaceutically acceptable salts thereof.

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4,303,589

## HYDROESTERIFICATION PROCESS

Gordon T. Chen, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 31, 1979, Ser. No. 108,762
Int. Cl.³ C11C *3/02*; C07C *51/10, 51/12*
U.S. Cl. 260—410.9 R 11 Claims

1. A process of hydroesterifying internal olefins to produce carboxylic acid esters of high normality by reaction of olefin, carbon monoxide and alcohol which comprises reacting same in the presence of a cobalt catalyst and a pyridine promoter at temperatures of about 170° to about 200° C. and pressures of about 1200 psi gauge to 1800 psi gauge, with cobalt constituting 2% to 6% by weight of the reaction mixture and the combination of cobalt concentration, temperature and pressure being such that the reaction rate is at least $k=4\ hr^{-1}$ and the ester product normality over 70%, adding a large amount of hydrocarbon to the resulting reaction product mixture thereby causing phasing, separating the phases with one phase containing substantially all the ester product, and the other phase containing in excess of 90% of the cobalt catalyst, and recycling the catalyst to the reaction.

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4,303,590

## METHOD FOR THE PREPARATION OF A LOWER ALKYL ESTER OF FATTY ACIDS

Yoshiro Tanaka, Ichikawa; Akio Okabe, and Susumu Ando, both of Chiba, all of Japan, assignors to Lion Corporation, Tokyo, Japan

Filed May 13, 1980, Ser. No. 149,418
Claims priority, application Japan, May 30, 1979, 54-67188
Int. Cl.³ C11C *3/02*; C09F *5/08*
U.S. Cl. 260—410.9 R 4 Claims

1. A method for the preparation of a lower alkyl ester of fatty acids by the alcoholysis reaction of a fatty acid glyceride with a lower alcohol which comprises the successive steps of

(a) esterifying the fatty acid glyceride by a first alcoholysis reaction with a lower alcohol in the presence of an alkali catalyst to form a first crude esterification product and glycerine, the conversion of the fatty acid glyceride being in the range of 90–97%,

(b) separating the glycerine from the first crude esterification product,

(c) esterifying further said crude esterification product in a second alcoholysis reaction with a lower alcohol in the presence of an alkali catalyst at an overall conversion of at least 98% to form a second crude esterification product containing the unreacted lower alcohol and glycerine dissolved or dispersed therein,

(d) admixing the second crude esterification product with water in an amount from 50% to 150% by weight based on the amount of the lower alcohol contained in the second crude esterification product, and

(e) subjecting the second crude esterification product admixed with water to phase separation into an aqueous layer and a layer of the lower alkyl ester of fatty acids.

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4,303,591

## REMOVAL OF STANNIC CHLORIDE

Ta-sen Chou; Perry C. Heath, both of Indianapolis, and Wayne D. Luke, West Lafayette, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Jul. 7, 1980, Ser. No. 166,004
Int. Cl.³ C07F *7/22*
U.S. Cl. 260—429.7 6 Claims

1. A process for removing stannic chloride from solutions thereof in organic solvent-based waste streams, wherein the solvent is benzene mono-or disubstituted with $C_1$–$C_3$ alkyl, chloro, bromo, $C_1$–$C_2$ alkoxy or nitro; benzene monosubstituted with $C_1$–$C_5$ alkoxycarbonyl, benzyloxycarbonyl, phenoxycarbonyl or acetyl; $C_1$–$C_5$ alkanol; $C_1$–$C_4$ alkane monosubstituted with $C_2$–$C_5$ alkanoyl, nitro or $C_2$–$C_3$ alkanoyloxy; acetonitrile; or $C_5$–$C_8$ cycloalkanone; mixtures of said solvents; or a mixture of one or more of said solvents with a minor amount of a $C_5$–$C_{10}$ alkane; which process comprises adding to the waste stream from about 2 to about 4 moles of dimethyl sulfoxide per mole of stannic chloride, and separating the resulting precipitate of dimethyl sulfoxide-stannic chloride complex from the waste stream.

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4,303,592

## AMIDINOPHENYLMETHYLSULFONYLFLUORIDE

Richard Laura, Somerville, and David H. Bing, Brookline, both of Mass., assignors to Center for Blood Research, Inc., Boston, Mass.

Filed Jan. 9, 1980, Ser. No. 110,592
Int. Cl.³ C07C *143/70*
U.S. Cl. 260—543 F 7 Claims

1. Amidinophenylmethylsulfonylfluoride.

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4,303,593

## PROCESS FOR THE DIMERIZATION OF HEXAFLUOROPROPENE OXIDE

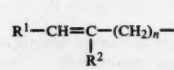
Gerhard Kühne, Burghausen, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Jun. 12, 1980, Ser. No. 158,929
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1979, 2924385
Int. Cl.³ C07C *51/58*
U.S. Cl. 260—544 F 1 Claim

1. A process for the catalytic dimerization of hexafluoropropene oxide, optionally mixed with hexafluoropropene, in the presence of an aprotic organic solvent at temperatures of $-10°$ to $+10°$ C. and under autogenous pressure, wherein the catalyst employed is a composition containing

(a) a mixture of a copper(I) compound of the formula $Cu_mX$ and a copper(II) compound of the formula $Cu_{m/2}X$, wherein $X=0$ or an anion and m denotes the valency of X, in the weight ratio of 70:30 to 95:5 and

(b) a complex-forming agent from the group of the nitriles of the formula



wherein $R^1$ and $R^2$, which are identical or different, denote H, CN or an alkyl radical of 1 to 6 C atoms and one of these alkyl radicals $R^1$ or $R^2$ can optionally be substituted by a CN group, and wherein $R^1$ and $R^2$ can also be linked to form a cyclic alkylene group with 3 to 10 C atoms, and wherein furthermore n denotes an integer from 0 to 5,

the isocyanides of the formula $R^3NC$, wherein $R^3$ denotes an alkyl radical, a cycloalkyl radical, an aralkyl radical or a mononuclear or binuclear aryl radical which is optionally substituted by 1 to 3 $CH_3$ groups,

the tertiary phosphines of the formula $R^4R^5R^6P$, wherein $R^4$, $R^5$ and $R^6$, which may be identical or different, denote an alkyl radical, a cycloalkyl radical, an aralkyl radical or a mononuclear or binuclear aryl radical which is optionally substituted by 1 to 3 $CH_3$ groups,

or the cyclic hydrocarbons with 2 or 3 double bonds and with 6 to 12 C atoms in the ring, or in bicyclic or tricyclic ring systems,

or mixtures of these complex-forming agents, the molar ratio of component (a) to component (b) being 1:1 to 1:8.

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**4,303,594**

## PROCESS FOR THE PRODUCTION OF ISOBUTYRIC ACID ANHYDRIDE

**Richard V. Norton; Lee R. Zehner, both of Dublin; Ralph F. Pascoe, Marysville; John E. Corn, Jr., Westerville, and Dace Grote, Columbus, all of Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.**

**Filed Apr. 25, 1980, Ser. No. 143,693**
**Int. Cl.³ C07C *51/54***
**U.S. Cl. 260—546** **5 Claims**

1. In a process for carbonylating propylene in the presence of a substantial excess of liquid anhydrous hydrogen fluoride to effect the formation of isobutyroyl fluoride followed by hydrolysis; the improvement of hydrolyzing the isobutyroyl fluoride to effect the formation of isobutyric acid anhydride and recycle anhydrous hydrogen fluoride comprising the steps:

(1) fractionating the carbonylation reaction mixture to provide unreacted anhydrous hydrogen fluoride for recycle and isobutyroyl fluoride;

(2) partially hydrolyzing the isobutyroyl fluoride at a temperature between about 0° and 100° C. in the presence of a hydrogen fluoride acceptor and from 0.05 to 0.5 mole of water per mole of the isobutyroyl fluoride whereby the water is used to extinction in the hydrolysis reaction thereby providing an equilibrium hydrolysis reaction mixture including a liquid phase consisting essentially of isobutyroyl fluoride and isobutyric acid anhydride and a solid phase consisting of a hydrogen fluoride complex of said acceptor;

(3) fractionally distilling said liquid phase of the hydrolysis reaction mixture to provide an overhead fraction of isobutyroyl fluoride for recycle to said hydrolysis step (2) and an isobutyric acid anhydride product fraction.

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**4,303,595**

## SILICONE-CONTAINING ELASTOMER AND PROCESS FOR THE PREPARATION THEREOF

**Dwight L. Allen, Akron, Ohio, assignor to Akron Catheter, Inc., Chippewa Lake, Ohio**

**Division of Ser. No. 963,085, Nov. 22, 1978, Pat. No. 4,196,144. This application Aug. 27, 1980, Ser. No. 181,752**
**Int. Cl.³ C08K *5/54, 3/22;* C08L *7/02;* C08K *3/34***
**U.S. Cl. 260—746** **3 Claims**

1. A process for the preparation of a silicone-containing elastomeric composition of matter comprising the steps of:

masterbatching a dimethylpolysiloxane compound, clay and titanium dioxide to form a dispersion;

adding said dispersion to a natural rubber latex with stirring; and, thereafter

forming and curing a product from the silicone-containing elastomeric composition wherein said dimethylpolysiloxane compound is present in an amount of more than 10 to about 50 parts by weight, based upon the weight of the rubber in the latex, the titanium dioxide is present in an amount of from about 5 to 15 parts by weight, based upon the weight of the rubber in the latex and the clay is present in an amount of from about 5 to 20 parts by weight, based upon the weight of the rubber in the latex.

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**4,303,596**

## SILICONE-CONTAINING ELASTOMER AND PROCESS FOR THE PREPARATION THEREOF

**Dwight L. Allen, Akron, Ohio, assignor to Akron Catheter, Inc., Chippewa Lake, Ohio**

**Division of Ser. No. 963,085, Nov. 22, 1978. This application Aug. 27, 1980, Ser. No. 181,754**
**Int. Cl.³ C08K *5/54, 3/22;* C08L *7/02;* C08K *3/34***
**U.S. Cl. 260—746** **5 Claims**

1. Medical and surgical instruments prepared from a composition comprising:

a natural rubber latex; and

from about 20 to about 85 parts by weight, based upon the weight of the rubber in said latex, of a masterbatch consisting of

a dimethylpolysiloxane compound having a viscosity average molecular weight of about 7,000 and a viscosity of about 100 centistokes, said compound being present in an amount of more than 10 to about 50 parts by weight, based upon the weight of the rubber in said latex, and being substantially free from phasing;

from about 5 to 15 parts by weight of titanium dioxide, based upon the weight of the rubber in said latex; and,

from about 5 to 20 parts by weight of clay, based upon the weight of the rubber in said latex.

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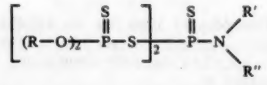
**4,303,597**

## O,O-DIALKYLDITHIOPHOSPHORYL-N-HYDROCARBYLTHIOPHOSPHORAMIDES

**Edward L. Kay, and Delmar F. Lohr, both of Akron, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio**

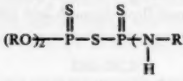
**Filed Oct. 5, 1979, Ser. No. 82,431**
**Int. Cl.³ C07F *9/165***
**U.S. Cl. 260—933** **6 Claims**

1. As a composition of matter, an S,S',di-(O,O'-dihydrocarbylthiophosphoryl)-N(hydrocarbyl)phosphoroamidotrithioate of the general structure and Formula:



wherein R, R' and R'' are independently selected from the group consisting of methyl, ethyl, n-propyl, isopropyl, n-butyl, n-butyl isomers, cyclohexyl, octyl, octyl isomers, stearyl and phenyl.

2. As a composition matter, an S-(O,O'-dihydrocarbylthiophosphoryl)-N,N'-di-(hydrocarbyl)phosphorodiamidodithioate of the general structure and Formula:



wherein R and R' are independently selected from the group consisting of methyl, ethyl, n-propyl, isopropyl, n-butyl, n-butyl isomers, cyclohexyl, octyl, octyl isomers, stearyl and phenyl.

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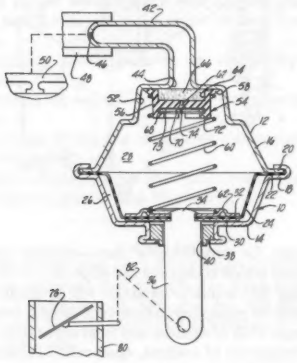
**4,303,598**

## VACUUM CONTROL ASSEMBLY

**Larry A. Neighbor, Holland, Mich., assignor to BLD Products, Ltd., Holland, Mich.**

**Filed Jun. 30, 1980, Ser. No. 164,807**
**Int. Cl.³ F02M *1/10***
**U.S. Cl. 261—39 B** **9 Claims**



1. A vacuum control assembly comprising: a generally cylindrical housing, a movable diaphragm assembly supported in and dividing the housing into a variable pressure control chamber and a constant pressure chamber at opposite sides of said diaphragm, the constant pressure chamber being in continuous communication with the atmosphere, an inlet port formed axially of the housing and communicating with the control chamber and being adapted for connection to a source of vacuum, the diaphragm assembly being movable from a first to a second position in response to vacuum pressure in the other of the chambers, the housing forming a cup-shaped recess axially aligned with the inlet port and communicating with the control chamber, a valve assembly having a flexible, resilient body member supported in the cup-shaped recess, the body member having a circumferential portion engageable with walls of the cup-shaped recess to locate the body member axially of the housing, resilient means acting between the diaphragm and the body member to urge the body member into sealing engagement with the bottom of the cup-shaped recess, the body member forming an open compartment, a passage communicating the compartment with the inlet port, a valve closure element being disposed in the compartment, a resilient flange formed by the body member at one end of said compartment for releasably confining the valve closure element in the cavity for movement between a first position in engagement with the flexible body member to close the passage in the presence of vacuum pressure in the inlet port and to a second position spaced from the passage in the absence of vacuum pressure in the inlet port to permit relatively unrestricted air flow to the control chamber, and means forming a passage in the valve assembly permitting restricted air flow between the inlet port and the control chamber when the valve closure element is in its first position to retard movement of said diaphragm assembly.

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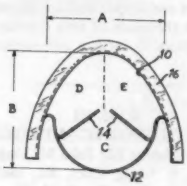
**4,303,599**

## TOWER PACKING

**Ralph F. Strigle, Jr., Akron, Ohio, and Kenneth E. Porter, MacclesField, England, assignors to Norton Company, Worcester, Mass.**

**Filed Nov. 1, 1977, Ser. No. 847,477**
**Int. Cl.³ B01F *3/04***
**U.S. Cl. 261—98** **5 Claims**



1. In a dumped packing for use in gas/liquid contact apparatus of the type where the packing comprises a perforated base member with free ends which curves around a notional axis to define a space which is at least partially enclosed by said base member, and at least one oppositely directed curved bridging member carried by said base member and extending clear of the base member into said space and defining the lower boundary thereof, the improvement wherein the base member is curved in the general shape of an ellipse which has an apex portion and open end portions, the apex portion having a shorter radius of curvature than the open end portions, and the height of the space (B FIG. 1), as measured from the apex of the base member to the bottom of the bridging member, being:

(a) substantially greater than the thickness of the base member, as measured parallel to the notional axis, at the open end, and

(b) greater than 0.75 times the width of the space (A FIG. 1), whereby said packing has a high hydraulic radius.

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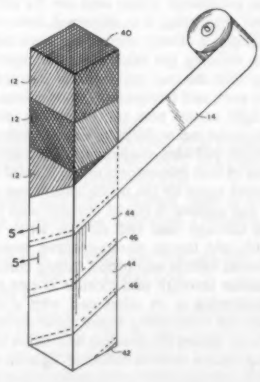
**4,303,600**

## REACTOR COLUMN

**Sheldon F. Roe, Jr., Cape Coral, Fla., assignor to The Munters Corporation, Ft. Myers, Fla.**

**Filed Jan. 8, 1981, Ser. No. 223,347**
**Int. Cl.³ B01F *3/04***
**U.S. Cl. 261—112** **11 Claims**



1. A reactor column comprising a plurality of blocks of

contact body material positioned in superimposed stacked relationship with each of said blocks formed of a plurality of corrugated sheets of material wherein all of the corrugations of each sheet are disposed at an angle to the horizontal and extend continuously in substantially straight lines from one edge of the sheets to another edge thereof with the corrugations in alternate sheets crossing the corrugations in the sheets disposed between the alternate sheets; and a plastic film wrapped about and tightly engaged with said blocks to form a self-supporting reactor column.

11. A reactor column comprising a plurality of blocks of contact body material formed of cross corrugated sheets stacked one upon another in superimposed relation to define a column having sides and upper and lower ends; and a plastic film wrapped about the sides of said column and tightly engaged with said blocks to form a self-supporting distillation column.

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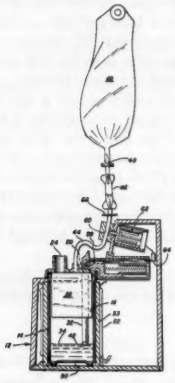
**4,303,601**

## VENTILATOR HUMIDIFIER

**Daniel J. Grimm, McHenry, Ill.; John M. Unger, Lake Geneva, Wis., and Robert A. Virag, Cary, Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Filed Mar. 31, 1980, Ser. No. 135,555**
**Int. Cl.³ A61M *15/00***
**U.S. Cl. 261—142** **8 Claims**



1. A humidifer for gases which comprises a metal can defining cylindrical walls and a closed bottom end, and a housing defining a well receiving said can in snug-fitting relationship, wick means positioned within said can for absorbing water in said can and presenting it in dispersed form to gases flowing through said can; a closure sealing the open mouth of said can, said closure defining gas inlet and outlet aperture ports communicating with the can interior; said closure also defining a light access port, and transparent probe means communicating with said light access port and extending into said can, said transparent probe means defining an end surface within the can interior which includes angled surfaces positioned to permit light passing in said transparent probe toward said end surface to be reflected again up the probe away from said end surface when said end surface is out of contact with liquid, and to be transmitted through said end surface when said probe is in contact with said liquid; photosensitive means positioned to detect reflected light in said probe, tubing communicating with the can interior through said closure at one end and adapted for communicating at its other end with a source of liquid; valve means for controlling liquid flow through said tubing; and transducer means for opening said valve means when said light sensing means detects reflected light in said transparent probe, and for closing said valve means when reflected light is not detected in said transparent probe, whereby gases passing into the gas inlet and out of the outlet are humidified by contact with liquid taken up by said wick means from a supply of liquid in said can having a volume controlled by the controlled amount of liquid flow through said tubing into the can.

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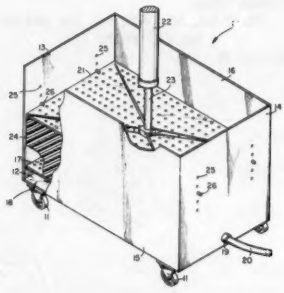
**4,303,602**

## PROCESS FOR THE PRODUCTION OF COMPOSITE FOAMED MATERIAL

**Seymour Lichter, 137 Fairway Dr., and Frank P. Nold, Rte. 2, Box 60, both of New Castle, Ind. 47362**

**Filed Jan. 26, 1981, Ser. No. 228,215**
**The portion of the term of this patent subsequent to Dec. 23, 1997, has been disclaimed.**
**Int. Cl.³ B29D *27/00***
**U.S. Cl. 264—45.4** **14 Claims**



1. A process for producing a flame-resistant composite foamed material which comprises the steps of:

a. combining into a mix from about 4% to about 15% of expandable or expanded polystyrene beads, from about 6% to about 25% of a binder and from about 60% to about 90% of fragments of resilient, open-celled neoprene;

b. compressing the mix within a mold to a density of from about 5 to about 30 lbs/ft$^3$; and

c. curing the binder while the mix is held in compression.

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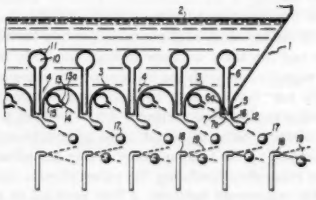
**4,303,603**

## METHOD AND APPARATUS FOR PRODUCING HOLLOW PLASTIC MICROSPHERES

**Leonard B. Torobin, Materials Technology Corp., P.O. Box 6844, Bellevue, Wash. 98007**

**Continuation of Ser. No. 59,296, Jul. 20, 1979, abandoned, which is a continuation-in-part of Ser. No. 944,643, Sep. 21, 1978, abandoned, and Ser. No. 937,123, Aug. 28, 1978, abandoned.**
**This application Jun. 19, 1980, Ser. No. 160,867**
**Int. Cl.³ B29D *9/04***
**U.S. Cl. 264—69** **58 Claims**



1. A method for making hollow microspheres from an organic film forming material which comprises forming a liquid film of said material across an orifice, applying a blowing gas at a positive pressure on the inner surface of the liquid film to blow the film and form the microsphere, subjecting the micro-

sphere during its formation to an external pulsating or fluctuating pressure field having periodic oscillations, said pulsating or fluctuating pressure field acting on said microsphere to assist in its formation and to assist in detaching the microsphere from said orifice.

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**4,303,604**

## METHOD OF MAKING A HIGH RATE CARBON CATHODE

**Sol Gilman, Rumson, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Apr. 14, 1980, Ser. No. 140,369**
**Int. Cl.³ B29D *9/08***
**U.S. Cl. 264—101** **5 Claims**

1. Method of making a high rate carbon cathode for use in lithium-sulfuryl chloride battery cells, said method including the steps of:

(A) mixing a carbon powder having a surface area of about 1000 square meters/gram with polytetrafluoroethylene and a sufficient amount of water to form a coherent mixture;

(B) applying the mixture to an electrically conductive screen,

(C) forming the cathode while wet to an intermediate thickness;

(D) vacuum drying the cathode at a temperature of about 100 degrees C.; and

(E) cold compressing the cathode to obtain a final electrode porosity of greater than 80 percent.

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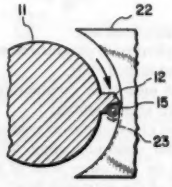
**4,303,605**

## PRODUCTION OF LAYERED TOOTHPICKS

**William H. Lichfield, Box 112, Corrine, Utah 84307**

**Filed Jun. 16, 1980, Ser. No. 159,484**
**Int. Cl.³ B29C *17/02*; B29D *7/18***
**U.S. Cl. 264—158** **9 Claims**




1. A method of producing a rolled and layered toothpick having a forwardly tapered front portion and hollow central cavity from a thin plastic film which comprises the step of:

(a) orienting a block of plastic of a predetermined thickness in a movable position along a fixed plane

(b) positioning a cutting tool comprising a generally rotatable cylindrical shaft containing a single cutting lip on the shaft wherein the cutting lip has a single cutting edge and a recess immediately adjacent said cutting edge, said tool being attached to means for rapidly rotating said tool in a fixed plane relative to said plastic block

(c) causing said tool to rotate rapidly, and

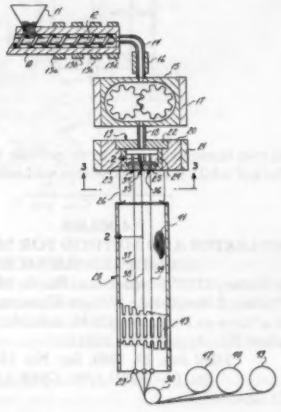
(d) moving said plastic block along said predetermined plane into contact with said rapidly rotating tool at a fixed rate of speed wherein for each complete revolution of said tool the cutting edge on said cutting lip severs from said block a plastic film having a thickness of from about 0.5 to 5.0 mils causing said severed film to enter into said cutting lip recess and be rolled therein by the rotation of said tool into a toothpick which is ejected from said tool as the cutting lip rotates out of contact with said plastic block.

**4,303,606**

## METHOD OF EXTRUDING POLYPROPYLENE YARN

**John S. Roberts, Ellicott, Md., assignor to Kling Tecs, Inc., Mantoloking, N.J.**

**Continuation of Ser. No. 893,371, Apr. 4, 1978, Pat. No. 4,193,961. This application Mar. 15, 1980, Ser. No. 127,360**
**The portion of the term of this patent subsequent to Mar. 18, 1997, has been disclaimed.**
**Int. Cl.³ D01D *5/12***
**U.S. Cl. 264—176 F** **14 Claims**



1. A method of producing polypropylene filaments, comprising heating polypropylene having a narrow molecular weight distribution with a swell value of less than 2.5 and a melt flow greater than 20 to a temperature at which it is molten, extruding the molten polypropylene at a temperature in the range 415° F. to 350° F. into a plurality of filaments, passing the filaments through a hot zone having a temperature sufficiently high to retard cooling of the filaments therein, drawing down the filaments in said hot zone, then passing the filaments through a quenching zone, and directing gas over the filaments in said quenching zone to cool them, the characteristics of the polypropylene, the temperature of extrusion, and the temperature of said hot zone interacting to substantially eliminate the occurrence of resonance in the filaments as they are drawn down in said hot zone.

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**4,303,607**

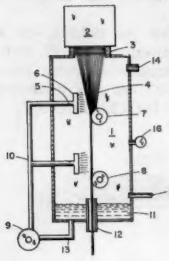
## PROCESS FOR MELT SPINNING ACRYLONITRILE POLYMER FIBER USING HOT WATER AS STRETCHING AID

**Francesco DeMaria, and Chi C. Young, both of Gulf Breeze, Fla., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Oct. 27, 1980, Ser. No. 201,099**
**Int. Cl.³ D01D *5/08***
**U.S. Cl. 264—178 F** **4 Claims**

1. A process for producing an acrylonitrile polymer fiber which comprises preparing a single phase melt of acrylonitrile polymer and water, extruding said melt through a spinneret directly into a steam-pressurized solidification zone maintained under conditions of temperature, pressure and saturation that enable the nascent extrudate to solidify, and to retain sufficient

water to remain in a stretchable plastic state, wetting the extrudate with hot water and stretching the wetted extrudate in



at least two stretch stages so as to provide molecular orientation thereof while it remains within said solidification zone.

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**4,303,608**

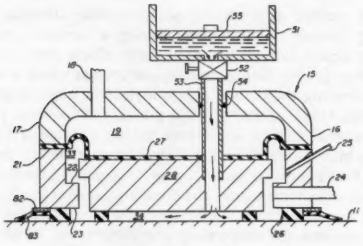
## APPARATUS AND METHOD FOR MOLDING OF SUBMERGED SURFACES

**Arthur Ticker, 12117 Maddox La., Bowie, Md. 20715; Herman S. Preiser, 2 Revell Rd.; William Klemens, 441 Bendale Rd., both of Severna Park, Md. 21146, and John L. Drake, Jr., 807 Windsor Rd., Arnold, Md. 21012**

**Filed Jan. 23, 1980, Ser. No. 114,454**

**Int. Cl.[3] B29F *1/06;* G01B *5/28***

**U.S. Cl. 264—40.1** **12 Claims**



**1.** A method of making a mold of a submerged surface comprising the steps of:

positioning a molding device against the submerged surface;

securing said molding device to the surface to form a molding region therebetween;

displacing water with air from said molding region to form an evacuated molding region; and

introducing a settable material into said evacuated molding region.

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**4,303,609**

## PROCESS FOR EXTRUDING A THERMOPLASTIC SHEATH IN THE FORM OF A TUBULAR FILM PROVIDED WITH PERFORATIONS AND DEVICE FOR CARRYING OUT THE PROCESS

**Jacques Hureau, Saint-Remy-des-Monts, 72 600 Mamers; Jean-Claude Hureau, 56, rue du Leon, 78 310 Maurepas, and Hubert Gaillard, 182, Avenue Rouget de Lisle, 94 400 Vitry, all of France**

**Filed Dec. 28, 1979, Ser. No. 107,835**

**Claims priority, application France, Jan. 3, 1978, 78 0089**

**Int. Cl.[3] B29C *24/00***

**U.S. Cl. 264—504** **13 Claims**

**1.** Process for the extrusion of a sheath of thermoplastic material to form a tubular film provided with perforations extending along the length of the sheath and over at least a first portion of the circumferential area, at least one other circumferential area remaining unperforated, comprising the steps of:

extruding a tubular film through a circular die;

guiding said tubular film while in the plastic state over a truncated skirt forming a shaper to expand the diameter of the tubular film;

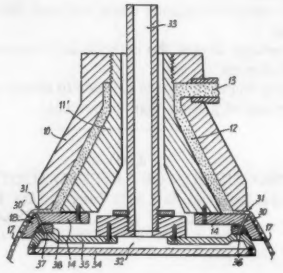
subjecting said film in said plastic state to intermittently blown first jets of air having a physical characteristic to intermittently perforate the film over said first portion of the area;

while subjecting said film to second air-cushioning jets of air having a physical characteristic incapable of perforating said film to enable the continuous flow of said film over said truncated skirt.

**6.** Device for extrusion of a sheath of thermoplastic material in the form of a tubular film comprising longitudinally extending areas provided with perforations alternating with longitudinally extending areas of continuous surface, said device comprising:

a downwardly directed extrusion head adapted to extrude a downwardly drawn tubular film;

a truncated skirt forming a shaper for expanding said tubular film and extending at the periphery of said extrusion head;



a source of pressurized air;

a chamber supplied with pressurized air, said chamber being contained inside said skirt;

communication means for conducting pressurized air from said source to said chamber;

first and second channel means passing through the wall of said skirt and communicating with said chamber and opening out on the outer wall of said skirt immediately downstream of the extrusion head;

a rotating distributor located inside said chamber and adapted to obturate said channel means intermittently;

and wherein the width of said first channel means are greater than the width of the second channel means and said first channel means, forming perforation channels, are so adapted as to blow an air jet strong enough to perforate the film, whilst the second channel means, forming air-cushion channels, are adapted to blow an air jet of mechanical characteristics less than those of the first channel means and thus are unable to perforate the film, the air blown by said second channel means forming an air-cushion between the film and the wall of the skirt facilitating the flow of the film on the skirt.

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**4,303,610**

## TEST KIT FOR FIELD ANALYSIS OF PLANT TISSUE MAGNESIUM AND CALCIUM

**John B. Sardisco, and Carroll O. Phillips, both of Shreveport, La., assignors to Pennzoil Company, Houston, Tex.**

**Filed May 19, 1980, Ser. No. 150,710**

**Int. Cl.[3] G01N *31/16***

**U.S. Cl. 422—61** **13 Claims**

**1.** A portable test kit for field analysis of the magnesium and calcium content of plant tissue, said kit comprising:

a test kit container having a base member, a cover member and a means that maintains said cover member vertical when said container is fully opened;

means for sampling plant tissue;

means for particulating the plant tissue sample;

at least one reservoir container into which the particulated plant tissue is transferred, the transfer being accomplished by use of a measured quantity of a deionized aqueous solvent whereby there is formed in said reservoir container an aqueous mixture of said particulated plant tissue;

demineralizing means for forming said deionized aqueous solvent from an aqueous solvent;

at least one reservoir vial having a lid means, into which said aqueous mixture is transferred from said reservoir container;

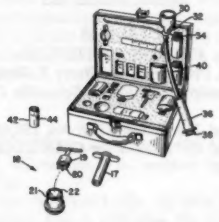
means for decolorizing a liquid sample, a part of said decolorizing means being chargeable to said reservoir vial to remove the color from said aqueous mixture;

means for filtering the decolorized aqueous mixture;

means for supporting said filtering means during filtration, said supporting means being directly attachable to said cover member;

means for exerting a vacuum on the decolorized aqueous mixture during filtration, and for collecting the aqueous filtrate;

at least two mixing vials each having an indicator line, into which there is transferred from said vacuum-exerting and filtrate-collecting means a quantity of said aqueous filtrate sufficient to fill each mixing vial to said indicator line; at



least one means for buffering said aqueous filtrate, said buffering means rendering magnesium ions unavailable during calcium ion titration; a portion of said buffering means being chargeable to one of said at least two mixing vials containing said aqueous filtrate;

at least one means for colorimetrically indicating the presence of calcium ions and being a first indicating means; a portion of said first indicating means being chargeable to said one of said at least two mixing vials, and imparting said aqueous filtrate with a first color in the presence of calcium ions and with a second color in the absence of calcium ions;

at least one means for titrating the quantity of calcium ions present, a portion of said calcium ion titrating means being introduceable into said one of said at least two mixing vials, into which said portion of said buffer means and said portion of said first indicator means is charged;

at least one means for colorimetrically indicating the presence of both calcium and magnesium ions and being a second indicator means; a portion of said second indicator means being introduceable into the other of said at least two mixing vials containing said aqueous filtrate, and imparting said aqueous filtrate with one color in the presence of calcium and magnesium ions and with another color in the absence of calcium and magnesium ions; and

at least one means for titrating the quantity of both calcium and magnesium ions present, a portion of said calcium and magnesium ion titrating means being chargeable to said other of said at least two mixing vials, into which said portion of said second indicating reagent is introduced.

**4,303,611**

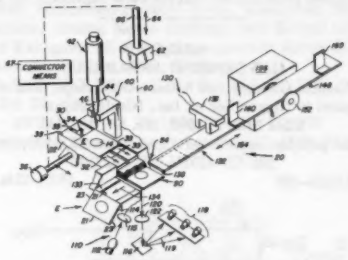
## ANALYZER APPARATUS FEATURING A SIMPLIFIED INCUBATOR

**Thomas C. Jessop, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Aug. 11, 1980, Ser. No. 177,050**

**Int. Cl.³ G01N *35/04***

**U.S. Cl. 422—65** **20 Claims**



1. In apparatus for the analysis of sample analytes using generally flat test elements having a first major surface that includes a sample-containing portion, and an opposing support surface, said apparatus including

(i) an incubator capable of containing a plurality of said test elements,

(ii) means for loading said test elements into said incubator at a first location, and means for unloading said test elements from said incubator at a second location, and

(iii) means adjacent said second location for detecting a response in the incubated test elements;

the improvement wherein said incubator includes means for (a) defining a path between said first and second locations, and (b) supporting a plurality of such elements for movement along said path with each element in contact with the adjacent elements and with the sample-containing portion of all but one of said elements being covered by said one or more support surfaces of an adjacent element.

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**4,303,612**

## GAS SENSITIVE DEVICES

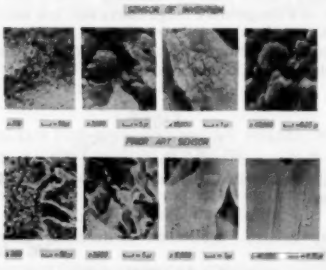
**John M. Sonley, Cobham, England, assignor to Diffracto Ltd., Windsor, Canada**

**Continuation of Ser. No. 17,274, Mar. 5, 1979, abandoned. This application Jun. 4, 1980, Ser. No. 156,386**

**Claims priority, application United Kingdom, Mar. 8, 1978, 9226/78**

**Int. Cl.³ G01N *27/16***

**U.S. Cl. 422—94** **7 Claims**



1. A catalytic gas sensing element comprising a noble metal filament having a porous coating of alumina which coating is

impregnated with a material which catalyses the oxidation of hydrocarbons wherein said element is formed by applying a slurry of alumina onto the filament, drying the applied slurry, applying a solution of the catalytic material to the dried alumina, drying the thus impregnated alumina and activating the catalytic material, wherein the particle size of the alumina, in at least the outer regions of the coating, is not more than 100 Å and wherein the alumina contains up to 0.6% by weight of sulphate ions present in at least the outer regions of the coating.

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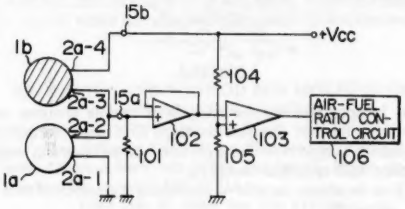
**4,303,613**

## GAS SENSING APPARATUS

**Eturo Yasuda, Okazaki, and Minoru Ohta, Anjo, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan**

**Filed Mar. 5, 1980, Ser. No. 127,490**
**Claims priority, application Japan, Mar. 15, 1979, 54-30804**
**Int. Cl.³ G01N *27/04, 27/16***
**U.S. Cl. 422—95** **4 Claims**




1. A gas sensing apparatus having:

a first sinter formed from a metal oxide having an electric resistance value which varies in accordance with the composition and temperature of a gas to be sensed, said first sinter having supported thereon a catalyst adapted to promote oxidation reaction of components of said gas;

a second sinter formed from a metal oxide having an electric resistance value which varies in accordance with the composition and temperature of said gas to be sensed; said second sinter having supported thereon no catalytic material similar to said catalyst;

said first and second sinters having electrodes therein and being arranged in association with each other so that said gas is sensed while compensating by said second sinter for changes in the electric resistance value of said first sinter with temperature; and

a single fixed resistor permanently connected in parallel electric circuit relation with said second sinter, the resistance value of said single fixed resistor being significantly smaller than the resistance value of said second sinter at a low temperature of said gas thereby rendering a voltage developed across said second sinter primarily governed by the resistance value of said single fixed resistor, and with the resistance value of said second sinter being significantly smaller than the resistance value of said fixed resistor in a temperature range above said low temperature of said gas thereby rendering the voltage developed across said second sinter as primarily governed by the resistance value of said second sinter.

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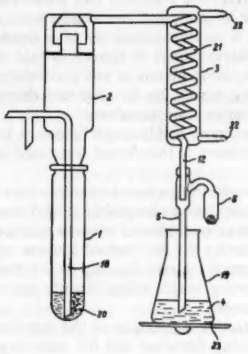
**4,303,614**

## DISTILLING UNIT

**Arthur Spring, and Arthur Baehr, both of Flawil, Switzerland, assignors to Buchi Laboratoriums-Technik AG, Flawil, Switzerland**

**Filed May 1, 1980, Ser. No. 145,883**
**Claims priority, application Switzerland, May 2, 1979, 4116/79**
**Int. Cl.³ B01L *11/00***
**U.S. Cl. 422—101** **5 Claims**

1. A distilling unit forming a closed system at least during the distilling operation, comprising a heatable distilling vessel, a distillate receiver, a condenser, and a distillate discharge pipe constructed and arranged to open into and dip into liquid in said distillate receiver, said distillate discharge pipe being connected with a ball valve for venting the closed system, said



ball valve comprising a vertical, substantially cylindrical valve housing with a valve opening disposed at its lower end closed by the ball by the force of gravity, and a conduit connecting the distillate discharge pipe and the ball valve, said conduit having an upwardly directed curved portion.

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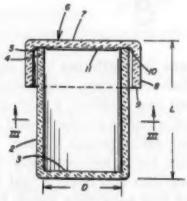
**4,303,615**

## CRUCIBLE WITH LID

**Solomon Jarmell, Pittsburgh, and Barry E. Rodgers, Eastmont, both of Pa., assignors to Fisher Scientific Company, Pittsburgh, Pa.**

**Filed Jun. 2, 1980, Ser. No. 155,662**
**Int. Cl.³ B01L *3/04*; G01N *25/00***
**U.S. Cl. 422—102** **4 Claims**



1. A self-sealing ceramic crucible and lid combination suitable for proximate analysis of coal or coke samples comprising:

A. a generally cylindrical crucible vessel having a substantially flat outside bottom surface on one end and being open on the other end, the wall of the vessel terminating at its open end in a rim which is circumferentially finished for sealing with the lid; and

B. a generally cup-shaped lid member having a circular top wall and a depending circumferential skirt portion which terminates in a circular edge, the upper surface of the top wall being generally flat, the lower surface of the top wall including a finished annular recess adjacent the depending skirt portion, the inside diameter of the top wall being slightly greater than the outside diameter of the crucible vessel such that when the lid member is placed on the crucible vessel the annular recess in the lower surface of the top wall rests on the finished rim of the crucible and the skirt of the lid member extends downwardly along the wall of the crucible, whereby a seal is effected by gravity engagement of the finished rim of the crucible with the finished annular recess of the lid to prevent air from enter-

ing the crucible during a volatile run, but permitting gases to be expelled from the crucible during the burn-off period without ashing the sample in the volatile portion of proximate analysis.

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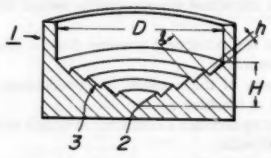
**4,303,616**

## AGGLUTINATION ANALYZING VESSEL

**Tokio Kano, Akishima, and Akira Tamagawa, Fuchu, both of Japan, assignors to Olympus Optical Co. Ltd., Tokyo, Japan**

**Filed Jun. 12, 1980, Ser. No. 159,000**
**Claims priority, application Japan, Jun. 20, 1979, 54-77643**
**Int. Cl.³ B01L *3/00*; G01N *33/54***
**U.S. Cl. 422—102** **11 Claims**




1. In a particle agglutination analyzing vessel having a base surface wherein particles can settle down along said base surface so as to form agglutination patterns on the base surface of the vessel to thereby effect an immunological analysis, wherein the improvement comprises said base surface is provided on at least one portion thereof with an inclined surface which is provided on at least one portion thereof with a plurality of regularly arranged engravings, said engravings being of such a depth and length to permit the formation of a clear and precise agglutination pattern of said settling down particles on said inclined base surface.

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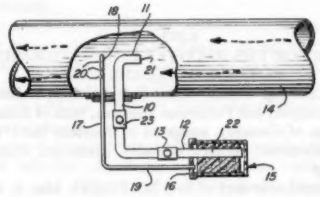
**4,303,617**

## ATMOSPHERIC CONTROL APPARATUS

**John D. Bryson, Milwaukee, Wis., assignor to Vaportek, Inc., Milwaukee, Wis.**

**Continuation of Ser. No. 31,661, Apr. 19, 1979, abandoned. This application Aug. 4, 1980, Ser. No. 174,862**
**Int. Cl.³ C01F *1/00*; C01G *15/00***
**U.S. Cl. 422—123** **6 Claims**




1. An atmospheric control apparatus for use in a forced air ventilation duct, said control apparatus comprising air inlet means having a first end in fluid communication with the interior of said duct, a second end positioned externally of said duct, and an auxiliary opening positioned externally of said duct, means for optionally closing said auxiliary opening, means for optionally closing said first end from fluid communication with the interior of said duct, outlet means positioned downstream from said air inlet means and having a first end in fluid communication with the interior of said duct and a second end positioned externally of said duct, and dispensing means interposed between said second end of said inlet means and said second end of said outlet means for receiving air from said inlet means and dispensing neutralizing vapor or odorant into said outlet means, whereby said atmospheric control apparatus is selectively operable with said first end of said air inlet means being in fluid communication with the interior of said duct and said auxiliary opening being closed or is operable with said auxiliary opening being in communication with the environment external to said duct and said first end of said air inlet means being closed.

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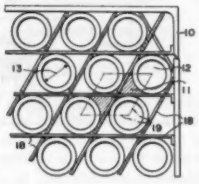
**4,303,618**

## CATALYTIC REACTOR

**Jun Fukui, Nishinomiya; Senji Niwa, Kakogawa; Norihiro Kawashima, Akashi; Kenro Ueshima, and Katumi Shimizu, both of Kakogawa, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan**

**PCT No. PCT/JP79/00301, § 371 Date Jul. 27, 1980, § 102(e) Date Jul. 21, 1980**
**PCT Filed Nov. 27, 1979, Ser. No. 201,487**
**Claims priority, application Japan, Nov. 27, 1978, 53-146732**
**Int. Cl.³ B01J *8/06, 19/18***
**U.S. Cl. 422—190** **2 Claims**




1. A catalytic reactor in which a plurality of pipe-shaped catalysts are arranged in parallel with each other and in which a catalytic reaction proceeds within the flow passages as defined by the inner surfaces of said pipe-shaped catalysts and also within the flow passages as defined by the spaces between the outer surfaces of said pipe-shaped catalysts, characterized in that said reactor includes a catalyst-supporting structure for supporting said pipe-shaped catalysts which is capable of varying the distance between adjacent pipe-shaped catalysts, whereby the cross-sectional area of said flow passages as defined by the spaces between the outer surfaces of the pipe-shaped catalysts is optimally set depending upon the operation conditions of the reactor by arranging the pipe-shaped catalysts so that the following relationship is satisfied:

$$K_1(S_1/G_1)=K_2(S_2/G_2)$$

where

$S_1$=cross sectional area of each of the inner flow passages,

$S_2$=cross sectional area of the outer flow passage per pipe-shaped catalyst,

$G_1$=flow rate of the reactant gas through each of the inner flow passages,

$G_2$=flow rate of the reactant gas through the outer flow passage per pipe-shaped catalyst,

$K_1$=apparent reation rate constant with respect to the catalytic reaction occurring in the inner flow passages,

and

$K_2$=apparent reaction rate constant with respect to the catalytic reaction occurring in the outer flow passages.

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**4,303,619**

## APPARATUS FOR CONTINUOUSLY PRODUCING POTASSIUM SULFATE

**Kazuo Kobayashi, Chibashi, and Heima Hirai, Sagamiharashi, both of Japan, assignors to Chisso Corporation, Osaka, Japan**

**Filed Jul. 7, 1980, Ser. No. 166,323**
**Int. Cl.³ F28G *3/10***
**U.S. Cl. 422—205** **1 Claim**

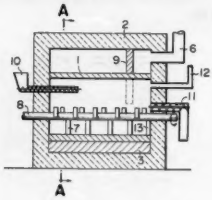
1. An apparatus for the production of potassium sulfate and hydrogen chloride gas from potassium hydrogen sulfate and potassium chloride, comprising:

(a) an elongated horizontal type muffle furnace having an

arcuate heat-conductive upper wall, said furnace having (i) at least one elongated and horizontally disposed agitator shaft which is equipped with agitating blades that are adapted to admix the reaction mixture therein rapidly by agitating and turning over said mixture so as to prevent it from adhering to the bottom of the furnace,

(ii) a raw material feeder located in a first end wall of said elongated furnace, said raw material-feeder extending inwardly into the furnace to a point which is located between the longitudinal center of the furnace and said first end wall,

(iii) a reaction product-discharging means located in a second end wall that is opposite from said first end wall, said reaction product-discharging means being located on a level higher than that of the axial center of said at least one agitator shaft,




(iv) an exit port in the furnace for the removal of hydrogen chloride gas generated,

(v) the agitating blade closest to the wall surface of the furnace which contains said reaction product-discharging means being positioned in close contact with said inner wall surface so as to be able to scrape the reaction mixture off said wall surface, and

(b) an outer casing surrounding said muffle furnace, in which casing said furnace is supported on a bed of an insulating material and the casing is spaced away from the top of the furnace to thereby form a passage for heating gas which provides the amount of heat necessary to complete the total reaction, said heating space over said furnace having an inlet port for introducing heating gas and an outlet port for the removal of heating gas, a drop arch type partititon wall being provided in the vicinity of said outlet port for exhaust gas.

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**4,303,620**

## EXTRACTION PROCESS

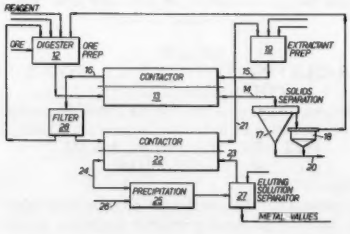
**John S. Rendall, Stanford-le-Hope, and Maurice J. Cahalan, Pangbourne, both of England, assignors to RTL Contactor Holding S.A., Zug, Switzerland**

**Filed Nov. 27, 1978, Ser. No. 963,775**

**Claims priority, application United Kingdom, Nov. 25, 1977, 49178/77**

**Int. Cl.³ C01G *43/00*; C01B *25/01***

**U.S. Cl. 423—6** **19 Claims**




1. A process for extracting at least one metal or non-metal value from a mineral containing such a value or values, comprising:

passing a mixture of the mineral and a liquid reagent through a contactor, whereby the mineral is caused to react with the reagent to convert the value or values into an extractable form; and

repeatedly showering the mixture, during its passage through the contactor, through a stream of an extractant for the value or values, the extractant being substantially immiscible with the liquid reagent and the extractant and the mixture forming substantially separate phases, whereby portions of the mixture during the passage are repeatedly passed through the extractant stream and portions of the extractant are repeatedly passed through the mixture.

15. A process for extracting uranium from a uranium ore concentrate, comprising

forming a slurry of the uranium ore concentrate and sulphuric acid as leaching agent;

passing the slurry through a contactor in which the leaching reaction proceeds;

showering the slurry, during its passage through the contactor, through a stream of an extractant for the uranium value selected from an organic solvent for the uranium, a chelating agent carried in kerosene and an ion exchange resin in the form of light-weight particles carried in a carrier liquid whereby portions of the slurry are repeatedly passed through the extractant during the passage and portions of the extractant are repeatedly passed through the slurry;

withdrawing separately from the contactor the extractant stream with the captured uranium value and a discharge stream of the sulphuric acid and residual concentrate; and

recovering the uranium from the extractant stream and recycling the extractant to the contactor.

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**4,303,621**

## PROCESS FOR THE RECOVERY OF METHIONINE AND POTASSIUM BICARBONATE

**Theodor Lussling, Hanau; Klaus-Peter Müller, Braunschweig; Gerd Schreyer, and Ferdinand Theissen, both of Hanau, all of Fed. Rep. of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 574,084, May 2, 1975, abandoned. This application Aug. 1, 1978, Ser. No. 930,012**

**Claims priority, application Fed. Rep. of Germany, May 2, 1974, 2421167**

**Int. Cl.³ C01D *7/00***

**U.S. Cl. 423—189** **13 Claims**

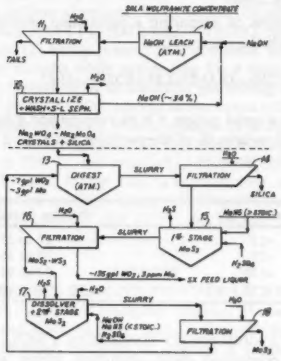
1. In a process for the recovery of methionine and potassium bicarbonate from the solution recycling in the process of forming methionine by hydrolyzing 5-[2-methyl-mercaptoethyl]-hydantoin with aqueous potassium carbonate to form a mother liquor and precipitating methionine formed with carbon dioxide, the improvement comprising concentrating the aqueous mother liquor after separtion of the precipitated methionine to a titratable potassium ion concentration of 120 grams per liter to 210 grams per liter, and then carbonating the concentrated mother liquor with carbon dioxide and lowering the temperature by cooling from a temperature of not over 120° C. during the carbonation to form an easily filterable crystallizate.

4,303,622

## CHEMICAL TREATMENT OF LOW-GRADE WOLFRAMITE CONCENTRATE HAVING HIGH MO/$WO_3$ RATIO

Dale K. Huggins, Golden; Leo W. Beckstead, Arvada, and Paul B. Queneau, Golden, all of Colo., assignors to Amax Inc., Greenwich, Conn.

Filed Jan. 19, 1981, Ser. No. 225,908
Int. Cl.³ C01G 39/00, 41/00
U.S. Cl. 423—55 16 Claims




1. A process for recovering tungsten and molybdenum from a tungsten solution containing molybdenum values which comprises:

adding to the solution an amount of a sulfide precipitating agent in stoichiometric excess of the amount of molybdenum present and adjusting the pH in a first sulfide precipitation step to precipitate substantially all of said molybdenum and some tungsten as a sulfide and produce a filtrate containing a major portion of said tungsten for the subsequent recovery thereof,

dissolving said sulfide precipitate in a dilute sodium hydroxide solution,

adding a stoichiometric deficient amount of a sulfide precipitating agent relative to the amount of molybdenum remaining and adjusting the pH in a second sulfide precipitation step to precipitate a major portion of said molybdenum and provide a filtrate containing residual tungsten and molybdenum.

4. A process for recovering tungsten and molybdenum from a tungsten solution containing molybdenum values which comprises:

adding to the solution an amount of a sulfide precipitating agent in a stoichiometric deficient amount relative to the amount of molybdenum present and adjusting the pH in a first sulfide precipitation step to precipitate molybdenum as a sulfide low in tungsten and produce a filtrate containing substantially all of said tungsten for the subsequent recovery thereof,

separating the filtrate from said precipitate,

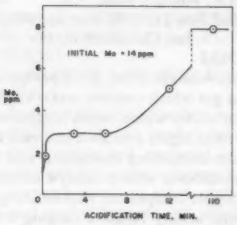
adding a stoichiometric excess amount of a sulfide precipitating agent relative to the amount of molybdenum in the filtrate and adjusting the pH thereof to precipitate substantially all of said molybdenum and some tungsten and provide a substantially molybdenum-free filtrate containing said tungsten in a second precipitation step, dissolving said precipitate in a sodium hydroxide solution and then returning the resulting solution to the main process stream upstream of the first precipitation step.

4,303,623

## SEPARATION OF TRACE MOLYBDENUM FROM TUNGSTATE SOLUTIONS

Dale K. Huggins; Paul B. Queneau, both of Golden; Robert C. Ziegler, Lakewood; Leo W. Beckstead, and Robert F. Hogsett, both of Arvada, all of Colo., assignors to Amax Inc., Greenwich, Conn.

Filed Jan. 19, 1981, Ser. No. 225,915
Int. Cl.³ C01G 39/00, 41/00
U.S. Cl. 423—55 27 Claims




1. A process for separating dissolved molybdenum values from a sodium tungstate solution having pH value above about 8 which comprises adjusting the pH value of the sodium tungstate solution with sulfuric acid to a pH value between about 8 and about 5, adding at least one water-soluble sulfide to the neutralized solution to provide and maintain a sulfide ion concentration of at least about 0.5 gram per liter in excess of that required to form sulfides of molybdenum and other metal impurities, and acidifying the sulfidized sodium tungstate solution through the pH range between about 5 and about 4.5 in less than about 8 minutes to a final pH value between about 4 and about 1.5 to precipitate molybdenum trisulfide and to provide a product solution containing less than about 3 ppm molybdenum.

14. A process for separating dissolved molybdenum values from a sodium tungstate solution having a pH value above about 8 which comprises: adjusting the pH value of the sodium tungstate solution with sulfuric acid to a pH value between about 8 and about 5, adding at least one water soluble sulfide to the pH adjusted solution to provide and maintain a sulfide ion concentration of at least about 0.5 gram per liter in excess of that required to form sulfides of molybdenum and other impurities, establishing a heel solution having a pH value between about 4 and about 1.5, and feeding sulfuric acid and the sulfidized sodium tungstate solution to the heel solution at a rate to maintain the pH value of the heel solution between about 4 and about 1.5 and to precipitate molybdenum trisulfide.

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4,303,624

## PURIFICATION OF ALKALI METAL CHLORIDE BRINES

Ronald L. Dotson, Cleveland, and Richard W. Lynch, Chattanooga, both of Tenn., assignors to Olin Corporation, New Haven, Conn.

Filed Sep. 12, 1980, Ser. No. 186,930
Int. Cl.³ C01D 3/04
U.S. Cl. 423—184 8 Claims

1. A method of purifying alkali metal chloride brine containing calcium ion impurities for introduction into an electrolytic cell having an anolyte compartment separated from a catholyte compartment by a barrier which is a membrane, comprising the steps of:

(a) adding to said brine a proportion of an alkali metal oxalate compound to form an insoluble calcium oxalate precipitate;

(b) separating said insoluble oxalate precipitate from said brine to purify said brine;

(c) recovering the resulting purified brine; and

(d) contacting said purified brine with an ion exchange resin

to further reduce the content of calcium ions in said purified brine.

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4,303,625

## TREATMENT OF REDUCING GAS FOR SUPPRESSION OF CORROSIVENESS

**Neville L. Cull, Baker, La., assignor to Exxon Research & Engineering Co., Florham Park, N.J.**

**Filed Feb. 21, 1978, Ser. No. 879,269**
**Int. Cl.[3] B01D *53/36***
**U.S. Cl. 423—213.2** **8 Claims**

1. In a process wherein a fuel gas is burned with air to produce an exhaust gas which contains water vapor, carbon dioxide and nitrogen oxides which, when compressed, cooled, and condensed can form highly corrosive carbonic and nitric acids, the improvement comprising contacting said exhaust gas, at net reducing conditions, with a catalyst comprising a Group VIII metal or copper composited with an inorganic oxide base having a Hammet acidity function ranging from about +6.8 Ho to about +1.5 Ho.

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4,303,626

## CRYSTALLINE ZEOLITE POWDER OF TYPE A (V)

**Hans Strack, Alzenau; Wolfgang Roebke, Wesseling; Dieter Kneitel, and Ehrfried Parr, both of Rodenbach, all of Fed. Rep. of Germany, assignors to Degussa & Henkel Kommanditgesellschaft auf Aktien, Frankfurt, Fed. Rep. of Germany**

**Filed Oct. 27, 1977, Ser. No. 846,012**
**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1976, 2651420**
**The portion of the term of this patent subsequent to Dec. 1, 1998, has been disclaimed.**
**Int. Cl.[3] C01B *33/28***
**U.S. Cl. 423—329** **9 Claims**

1. A process of preparing a crystalline zeolite powder of Type A with the composition:

$$1.0\pm0.2\ M_{2/n}O{:}Al_2O_3{:}1.85\pm0.5SiO_2{\cdot}y\ H_2O$$

where M is a sodium cation, n is its valence and y has a value up to 6 with 50 weight % of the particles not over 6.2μ and with a particle spectrum

| Fraction (μ) | Portion (weight %) |
|---|---|
| <3 | 10 to 60 |
| <5 | 25 to 95 |
| <10 | 80 to 99 |
| <15 | 92 to 100 |

comprising hydrothermally crystallizing a $SiO_2$, $Al_2O_3$, $M_2O$ and water containing alkali aluminate, water, alkali silicate synthesis mixture where M is sodium, said process including the steps of providing an aqueous sodium aluminate liquor having a temperature of 50° to 90° C. and containing 0.1 to 100 grams of $Al_2O_3$/l and 1 to 200 grams of $Na_2O$/l, feeding in with stirring sodium silicate solution containing 50 to 150 grams of $Na_2O$/l and 200 grams to 450 grams of $SiO_2$/l to form a turbid reaction mixture having the composition $SiO_2/Al_2O_3=2$ to 50:1, $Na_2O/SiO_2=0.2$ to 20:1 and $H_2O/Na_2O=4$ to 300:1, adding with stirring in two steps, with the second step being at a higher rate, an aqueous sodium aluminate which contains 10 to 200 grams/l of $Al_2O_3$ and 10 to 250 grams/l of $Na_2O$ and having a temperature of 10° to 100° C. and allowing the thus obtained synthesis mixture to crystallize at a temperature within between 20° and 175° C. for at least 15 minutes.

4,303,627

## CRYSTALLINE ZEOLITE POWDER OF TYPE A (VI)

**Hans Strack, Alzenau; Wolfgang Roebke, Wesseling; Dieter Kneitel, and Ehrfried Parr, both of Rodenbach, all of Fed. Rep. of Germany, assignors to Degussa & Henkel Kommanditgesellschaft auf Aktien, Frankfurt, Fed. Rep. of Germany**

**Filed Oct. 27, 1977, Ser. No. 846,013**
**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1976, 2651437**
**The portion of the term of this patent subsequent to Dec. 1, 1998, has been disclaimed.**
**Int. Cl.[3] C01B *33/28***
**U.S. Cl. 423—329** **11 Claims**

1. A process of preparing a crystalline zeolite powder of Type A with the composition:

$$1.0\pm0.2M_{2/n}O{:}Al_2O_3{:}1,85\pm0.5SiO_2{.}yH_2O$$

where M is a metal cation, n is its valence and y has a value up to 6 with 50 weight % of the particles not over 5.9μ and with a particle spectrum:

| Fraction (μ) | Portion (weight %) |
|---|---|
| <3 | 15 to 25 |
| <5 | 35 to 55 |
| <10 | 80 to 94 |
| <15 | 96 to 100 |

comprising hydrothermally crystallizing a $SiO_2$, $Al_2O_3$, $M_2O$ and water containing alkali aluminate, water, alkali silicate synthesis mixture where M is sodium, said process including the steps of providing water in a container, simultaneously feeding into the water at a temperature of 30° to 100° C. an aqueous sodium aluminate liquor containing 100 to 200 grams/l of $Na_2O$ and 50 to 150 grams/l of $Al_2O_3$ and sodium silicate solution containing 50 to 150 grams of $Na_2O$/l and 200 and 450 grams of $SiO_2$/l, wherein the proportion of the water in the container to the aqueous sodium aluminate liquor is 2 to 4:1 by volume, diluting with water to obtain a gel containing synthesis premixture having the composition $SiO_2/Al_2O_3=2$ to 50:1, $Na_2O/SiO_2=0.2$ to 20:1 and $H_2O/Na_2O=4$ to 300:1 adding further sodium aluminate liquor of the same composition and water having a temperature of 10° to 100° C. with stirring and wherein the proportion of sodium aluminate liquor to the water is 6 to 10:1 by volume and allowing the thus obtained synthesis mixture to crystallize at a temperature within between 20° and 175° C. in at least 15 minutes.

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4,303,628

## CRYSTALLINE ZEOLITE POWDER OF TYPE A (IV)

**Hans Strack, Alzenau; Wolfgang Roebke, Wesseling; Dieter Kneitel, and Ehrfried Parr, both of Rodenbach, all of Fed. Rep. of Germany, assignors to Degussa & Henkel Kommanditgesellschaft auf Aktien, Frankfurt, Fed. Rep. of Germany**

**Filed Oct. 27, 1977, Ser. No. 846,014**
**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1976, 2651419**
**The portion of the term of this patent subsequent to Dec. 1, 1998, has been disclaimed.**
**Int. Cl.[3] C01B *33/28***
**U.S. Cl. 423—329** **12 Claims**

1. A process of preparing crystalline zeolite powder of Type A with the composition:

$$1.0\pm0.2\ M_{2/n}O{:}Al_2O_3{:}1.85\pm0.5\ SiO_2{\cdot}y\ H_2O$$

where M is a sodium cation, n is its valence and y has a value up to 6 with 50 eight % of the particle not over 4.9μ and with a particle spectrum:

| Fraction (μ) | Portion (weight %) |
|---|---|
| <3 | 10 to 60 |
| <5 | 55 to 95 |
| <10 | 93 to 99 |
| <15 | 96 to 100 |

comprising hydrothermally crystallizing a $SiO_2$, $Al_2O_3$, $Na_2O$ and water containing alkali aluminate, water, alkali silicate synthesis mixture, said process including the steps of mixing with stirring (1) an aqueous sodium silicate solution containing 50 to 150 grams of $Na_2O$/l and 200 to 450 grams of $SiO_2$/l and (2) aqueous sodium aluminate liquor which contains 0.1 to 100 grams/l of $Al_2O_3$ and 1 to 200 grams/l of $Na_2O$, one of components (1) and (2) being present in a container and the other being added thereto while preventing for a time of 10 to 30 minutes the formation of an insoluble gel having an $SiO_2/Al_2O_3$ ratio of from 2 to 50:1, adding in two steps with stirring an aqueous sodium aluminate which contains 10 to 200 grams/l of $Al_2O_3$ and 10 to 250 grams/l of $Na_2O$ and having a temperature of 10° to 100° C., the speed of addition of the second step being 2 to 10 times higher than in the first step, and allowing the thus obtained synthesis mixture to crystallize at a temperature within between 20° and 175° C. for at least 15 minutes.

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**4,303,629**

## CRYSTALLINE ZEOLITE POWDER OF TYPE A (I)

**Hans Strack, Alzenau; Wolfgang Roebke, Wesseling; Dieter Kneitel, and Ehrfried Parr, both of Rodenbach, all of Fed. Rep. of Germany, assignors to Degussa & Henkel Kommanditgesellschaft auf Aktien, Frankfurt, Fed. Rep. of Germany**

**Filed Oct. 27, 1977, Ser. No. 846,015**

**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1976, 2651485**

**The portion of the term of this patent subsequent to Dec. 1, 1998, has been disclaimed.**

**Int. Cl.³ C01B** *33/28*

**U.S. Cl. 423—329** **10 Claims**

1. A process of preparing a crystalline zeolite powder of Type A with the composition

$$1.0\pm0.2\ M_{2/n}O{:}Al_2O_3{:}1.85\pm0.5\ SiO_2{\cdot}yH_2O$$

where M is a sodium cation, n is its valence and y has a value up to 6 with 50 weight % of the particles not over 4.0μ and with a particle spectrum:

| Fraction (μ) | Portion (weight %) |
|---|---|
| <3 | 35 to 60 |
| <5 | 82 to 95 |
| <10 | 93 to 99 |
| <15 | 96 to 100 |

comprising hydrothermally crystallizing a $SiO_2$, $Al_2O_3$, $M_2O$ and water containing alkali aluminate, water, alkali silicate synthesis mixture where M is sodium, said process including the steps of providing an aqueous sodium silicate solution containing 50 to 150 grams of $Na_2O$/l and 200 to 450 grams of $SiO_2$/l, heating it to a temperature between 30° and 80° C., adding to the sodium silicate solution with stirring aqueous sodium aluminate having a content of 0.1 to 100 grams $Al_2O_3$/l and 1 to 200 grams of $Na_2O$/l and having a temperature of from 30° to 100° C. until the turbidity point of the reaction mixture is reached within 10 to 60 minutes, adding with stirring in two steps to the turbid reaction mixture which had the composition $SiO_2/Al_2O_3=2$ to 50:1, $M_2O/SiO_2=0.2$ to 20:1 and $H_2O/M_2O=4$ to 300:1 an aqueous sodium aluminate which contains 10 to 200 grams/l of $Al_2O_3$ and 10 to 250 grams/l of $Na_2O$ having a temperature of 10° to 100° C., the speed of addition in the second step being 2 to 10 times higher than the in the first step and allowing the thus obtained synthesis mixture to crystallize at a temperature within between 20° and 175° C. for at least 15 minutes.

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**4,303,630**

## PROCESS FOR THE PRODUCTION OF CARBON MONOXIDE

**Kozo Sano; Hideo Igarashi, and Takeo Ikarashi, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan**

**Filed Aug. 6, 1980, Ser. No. 175,839**

**Claims priority, application Japan, Aug. 17, 1979, 54-104621; Mar. 3, 1980, 55-26366**

**Int. Cl.³ C01B** *31/18;* **C07C** *31/04*

**U.S. Cl. 423—415 A** **12 Claims**

1. A process for the production of carbon monoxide, characterized by selectively pyrolyzing methyl formate alone in a mixture of methyl formate and methanol in a temperature range wherein said methyl formate pyrolyzes in presence of an alkali metal compound which as substantially no reactivity with methanol and methyl formate and which is other than alkali metal alcoholates to obtain carbon monoxide of high purity and methanol.

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**4,303,631**

## PROCESS FOR PRODUCING CARBON FIBERS

**Richard T. Lewis, Parma, and Irwin C. Lewis, Strongsville, both of Ohio, assignors to Union Carbide Corporation, New York, N.Y.**

**Filed Jun. 26, 1980, Ser. No. 163,141**

**Int. Cl.³ D01F** *9/14;* **C10C** *3/00*

**U.S. Cl. 423—447.1** **20 Claims**

1. A process for producing a carbon fiber, comprising the steps of converting a selected precursor material into a mesophase pitch, spinning the mesophase pitch into at least one pitch fiber, and converting the pitch fiber into a carbon fiber; wherein the improvement comprises:

converting said precursor material into a mesophase containing pitch by a first heat treatment of said precursor material with agitation but without sparging at about atmospheric pressure in a non-reactive gaseous environment until a preliminary pitch having a mesophase content from about 20% to about 50% by weight is obtained; and

thereafter, a second heat treatment of said preliminary pitch at about atmospheric pressure with both agitation and sparging with a non-reactive gas until a mesophase pitch having a mesophase content of at least 70% by weight is obtained.

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**4,303,632**

## PREPARATION OF HYDROGEN PEROXIDE

**Lawrence W. Gosser, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Dec. 14, 1979, Ser. No. 103,061**

**Int. Cl.³ C01B** *15/02*

**U.S. Cl. 423—591** **10 Claims**

1. Non-catalytic process for preparing hydrogen peroxide, which process comprises contacting and reacting a diarylmethanol having 13 to 25 carbon atoms and of the formula RCHOHR′ wherein each of R and R′ is aryl, the same or different, in the liquid state, at a temperature of about 130°-260° C., with a gas stream containing oxygen to produce hydrogen peroxide and diaryl ketone of the formula RCOR′ wherein R and R′ are the same as above, which hydrogen peroxide is carried out of the liquid by the gas stream.

4,303,633

## METHOD OF RECOVERING ELEMENTAL SULFUR FROM REACTIVE GASES CONTAINING SULFUR DIOXIDE AND HYDROGEN SULFIDE

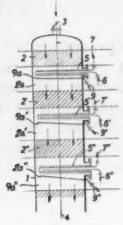
Adolf Thomsen, Bad Homburg, Fed. Rep. of Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 648,015, Jan. 12, 1976, abandoned. This application Jun. 28, 1977, Ser. No. 810,756

Claims priority, application Fed. Rep. of Germany, Jan. 16, 1975, 2501557

Int. Cl.[3] C01B *17/04*

U.S. Cl. 423—574 R 1 Claim



1. A method of recovering elemental sulfur from a reaction gas catalytically reactive to form elemental sulfur in a vapor state in an exothermic reaction, comprising the steps of:

(a) passing said gas at a temperature within the activation range of said reaction downwardly through a first horizontal bed of a catalyst body maintained at a temperature within the activation temperature range for said reaction from an input side of said body toward a discharge side thereof, thereby forming a hot gas containing elemental sulfur in vapor state, said gas having a subatmospheric pressure;

(b) partially condensing the sulfur in the vapor state of the hot gas of produced in step (a) and thereby partially condensing the sulfur from said gas by cooling said hot gas in contact with a cooling surface arranged within said body beneath said bed without cooling the bed thereabove, said cooling surface having a temperature about 100° to 150° C. below the temperature of the gas emerging from the bed thereabove but below the condensation temperature for sulfur and maintained by means of a cooling liquid flowing through a passage of which said surface forms a wall;

(c) collecting and discharging the condensed and liquefied sulfur and thereby separating it from said hot gas immediately upon condensation;

(d) passing the gas after the partial condensation of sulfur therefrom in step (b) into a further horizontal bed of said catalyst body located below the bed previously traversed by the gas and sustaining said exothermic reaction in said further bed to increase the sulfur-vapor content of the gas in the further bed;

(e) repeating steps (b) through (d) for each of a plurality of catalyst beds disposed below said first bed and below one another;

(f) discharging said gas after the last contact with a cooling surface at said discharge side of said body; and

(g) maintaining the temperature of the gas in all said beds above that at which said catalytic reaction can proceed and above that at which elemental sulfur vapor is totally condensed from the reaction gases solely by the exothermicity of the reaction in each bed after the first bed.

4,303,634

## METHOD OF CATALYST PREPARATION

John G. Gatsis, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 73,176, Sep. 7, 1979, abandoned. This application Sep. 19, 1980, Ser. No. 189,387

Int. Cl.[3] C01B *17/20;* C01G *39/06;* B01J *27/04*

U.S. Cl. 423—561 R 3 Claims

1. A method of preparing an unsupported molybdenum sulfide catalyst which comprise reacting molybdenum oxide with ammonium sulfide at a temperature and pressure selected to produce an ammonium salt of molybdenum sulfide and thereafter thermally decomposing said ammonium salt of molybdenum sulfide in a non-oxidative atmosphere to form said unsupported molybdenum sulfide catalyst.

4,303,635

## ZINC SULFIDE BODY FOR OPTICAL PURPOSES

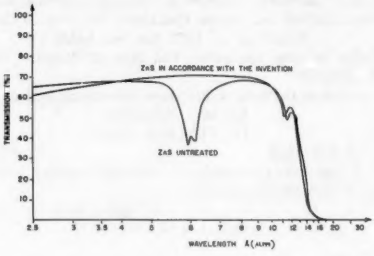
Fritz Aldinger, Rodenbach, and Waltraud Werdecker, Hanau, both of Fed. Rep. of Germany, assignors to W. C. Heraeus GmbH, Postfach, Fed. Rep. of Germany

Filed May 15, 1980, Ser. No. 150,378

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1979, 2949512

Int. Cl.[3] C01G *9/08;* B29D *11/00;* G02B *5/22*

U.S. Cl. 423—561 B 8 Claims




1. A process for improving the light transmission from the 0.4 to about 0.5 micron wavelength range and the transmission at about 6 micron wavelength of an optical zinc sulfide body, produced by the CVD (Chemical Vapor Deposition) Technique which comprises contacting said optical zinc sulfide body at a temperature of at least 300° C. with a gas or gas mixture which is under a pressure ranging from 800 to 3000 bars, which gas or gas mixture does not react to the said optical zinc sulfide body.

4,303,636

## CANCER TREATMENT

Robert T. Gordon, 4936 W. Estes, Skokie, Ill. 60076

Division of Ser. No. 651,395, Jan. 22, 1976, Pat. No. 4,106,488, which is a continuation-in-part of Ser. No. 499,074, Aug. 20, 1974, abandoned. This application May 12, 1978, Ser. No. 905,555

Int. Cl.[3] A61K *43/00, 49/00;* G01T *1/00*

U.S. Cl. 424—1 7 Claims

1. A cancer treating composition for intravenous injection comprising: inductively heatable particles selected from the group consisting of ferromagnetic, paramagnetic and diamagnetic and of not greater than 1 micron suspended in an aqueous solution in dosage form.

4,303,637

## MEDICATION INDICATED FOR OCULAR HYPERTENSION

John W. Shell, Hillsborough, and Robert M. Gale, Mountain View, both of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Filed Apr. 4, 1980, Ser. No. 137,456
Int. Cl.[3] A61K 9/22, 9/26, 9/50
U.S. Cl. 424—14 24 Claims

1. An ocular insert comprising depots of from 0.01 weight percent to 50 weight percent of a beta-adrenergic receptor blocker drug solute comprising a solute of the formula selected from the group consisting of (1) $R_1$-O-$CH_2$—$CH$—$(OR_2)$—$CH_2$—NH—$R_3$ and (2) $R_5$—$CH(OR_2)$—$CH(R_4)$—NH—$R_3$ wherein:

$R_1$ is a member selected from the group consisting essentially of unsubstituted and substituted phenyl, indanyl and indenyl, with the substituent bonded thereto a member selected from the group consisting essentially of lower alkyl, lower alkenyl, lower alkynyl, lower alkyloxy, lower alkenyloxy, lower alkynyloxy, lower alkoxy-lower alkyl, lower alkoxy-lower alkoxy, lower alkylthio, lower alkenylthio, lower alkylthio-lower alkyl, lower alkoxy-lower alkylthio, halogen, halogen-lower alkyl, hydroxyl, hydroxyl-lower alkyl, carboxyl, carboamoyl, N-lower alkyl carbamoyl, N,N-dilower alkyl carbamoyl, N-lower alkyl carbamoyl-lower alkyl, N,N-di-lower alkyl carbamoyl-lower alkyl, lower alkanoylamino-lower alkenyl, lower alkanoylamino-lower alkenyl, lower alkyanoylamino-lower alkenyl, lower alkoxy, N-lower alkylamino, N,N-di-lower alkylamino, lower alkoxycarbonyl, lower alkoxy-carbonylamino, lower alkoxycarbonylamino-lower alkyl, lower alkoxycarbonylamino-lower alkenyl, lower alkoxycarbonylamino-lower alkoxy, lower akylcarbonylamino-lower alkyl, N'-lower alkyl-ureido, N,N'-dilower alkyl-ureido, lower alkylsulphonylamino, cyano, nitro, and, cycloaliphatic;

$R_2$ is a member selected from the group consisting of hydrogen and acyl;

$R_3$ is a member selected from the group consisting of lower alkyl, lower alkenyl, lower alkynyl, cycloaliphatic, aryl, araliphatic, lower alkyl-aryl, lower alkoxy-aryl, lower alkyl aryl-lower alkoxy, lower alkyl aryl-lower alkyl, lower alkyl aryl-lower alkenyl, lower alkyl aryl-lower alkynyl, lower alkoxy aryl-lower alkyl, lower alkoxy aryl-lower alkenyl, lower alkoxy aryl-lower alkynyl, lower alkoxy aryl-lower alkoxy, aryl-lower alkyl, aryl-lower alkenyl, aryl-lower alkynyl,aryl-lower alkoxy, aryloxy-lower alkyl, aryloxy-lower alkoxy, N-lower alkylcarbamoyl, N,N-di-lower alkylcarbamoyl, lower alkoxycarbamoyl-lower alkyl, cyano-lower alkyl, arylcarbamoyl, and lower alkoxyphenyl-carbamoyl;

$R_4$ is a member selected from the group consisting of hydrogen and lower alkyl;

$R_5$ is the same as $R_1$ with the provisions when $R_5$ is substituent with hydroxyl, the ring has an additional substituent other than hydroxyl bonded thereto selected from $R_1$; and the remaining weight percent up to 100 weight percent of a pharmaceutically acceptable, non-toxic polymer, that surrounds substantially individually the depots of the beta-adrenergic drug solute, and binds them into the ocular insert, said polymer a member selected from the group consisting of poly(olefin), poly(vinylolefin), poly(haloolefin), poly(styrene), poly(vinyl), poly(acrylate), poly(-methacrylate), poly(oxide), poly(ester), poly(amide), and poly(carbonate), which insert is sized, shaped and adapted for easy insertion and prolonged retention in the eye for administering a therapeutically effective amount of the drug thereto to occupy and interact with the beta-receptors for managing intraocular pressure over a prolonged period of time.

4,303,638

## CHOLERA VACCINE

Jean-Louis Tayot, La Tour de Salvagny, and Marie-Claude Mynard, Ste. Foy-les-Lepon, both of France, assignors to Institut Merieux, Lyons, France

Filed Sep. 19, 1978, Ser. No. 944,122
Claims priority, application France, Sep. 19, 1977, 77 28162
Int. Cl.[3] A61K 9/32, 9/58
U.S. Cl. 424—32 31 Claims

1. A process for the preparation of a particulate material capable of inducing immunity and inducing the synthesis of antibodies to cholera toxin when administered to a living organism that possesses an immunity defense system which comprises support particles provided with a first coating of a ganglioside having an affinity for cholera toxin and a second coating of cholera toxin attached to said ganglioside coating, said support particles being selected from red blood corpuscles, inactivated bacteria particles, an organic polymer capable of giving a stable suspension in water, carbon particles or porous mineral particles coated with a polysaccharide polymer or with an oxidative scission product thereof, crosslinked or not, said process comprising in a first stage affixing said ganglioside onto said support particles to provide said first coating on said support particles and in a second stage affixing said cholera toxin onto said ganglioside coating.

16. An parenterally administrable medicine for inducing an immunity response to cholera toxin comprising a dosage of a particulate material capable of inducing immunity and inducing the synthesis of antibodies to cholera toxin consisting essentially of support particles selected from inactivated bacteria particles and soluble polysaccharides provided with a first coating of a ganglioside having an affinity for cholera toxin and a second coating of cholera toxin attached to said ganglioside coating, said dosage being effective to induce said immunity response.

28. A process for inducing the formation of cholera antitoxin antibodies comprising injecting into an animal a particulate material comprising support particles provided with a first coating of a ganglioside having an affinity for cholera toxin and a second coating of cholera toxin attached to said ganglioside coating, said support particles being selected from red blood corpuscles, inactivated bacteria particles, an organic polymer capable of giving a stable suspension in water, carbon particles or porous mineral particles coated with a polysaccharide polymer or with an oxidative scission product thereof, crosslinked or not so as to induce the synthesis of said cholera antitoxin antibodies and subsequently isolating the said resulting antibodies.

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4,303,639

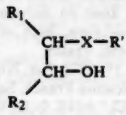
## 1,2-ALKANEDIOL DERIVATIVES IN COSMETIC COMPOSITIONS AS AN EXCIPIENT THEREFOR

Guy Vanlerberghe, Montjay-La-Tour, and Henri Sebag, Paris, both of France, assignors to Societe Anonyme dite: l'Oreal, Paris, France

Continuation of Ser. No. 602,963, Aug. 8, 1975, abandoned. This application Jan. 21, 1977, Ser. No. 760,921
Claims priority, application Luxembourg, Aug. 12, 1974, 70718
Int. Cl.[3] A61K 7/021, 7/025, 7/031, 7/032
U.S. Cl. 424—63 22 Claims

1. In a cosmetic composition for application to living human skin comprising a lip rouge, an eyelid shadow, a cream, a liquid dye foundation, a cheek rouge, or a hygiene spray and containing an excipient in an amount sufficient to impart to said cosmetic composition unctuousness, ease of application, and good spreadability on the skin, without an oily or greasy feel or touch, wherein the improvement comprises as said excipient at least one 1,2-alkanediol derivative selected from the group consisting of:

(1) a derivative having the formula



wherein X represents a member selected from the group consisting of oxygen and carbonyloxy of the formula

linked to R' through the free bond of the carbon atom of the carbonyloxy group, R' represents alkyl having 5–21 carbon atoms, said alkyl being the hydrocarbon residue of a member selected from the group consisting of R'OH and R'COOH wherein R' is defined above or where X represents

R' represents the hydrocarbon residue of lanolic acid, one of $R_1$ and $R_2$ represents linear alkyl having 8 to 16 carbon atoms and the other represents hydrogen; and

(2) a mixture consisting of (1),

said excipient present in an amount sufficient to impart to said cosmetic composition unctuousness, ease of application and good spreadability on the skin, without an oily or greasy feel or touch.

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**4,303,640**

## OIL-IN-WATER ORGANOPHOSPHORUS INSECTICIDAL EMULSION

**Hiroshi Fuyama, Toyonaka, and Kozo Tsuji, Takatsuki, both of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan**

**Filed Mar. 17, 1980, Ser. No. 130,683**
**Claims priority, application Japan, Mar. 16, 1979, 54-31566**
**Int. Cl.³ A01N *57/00, 57/26***
**U.S. Cl. 424—78** **7 Claims**

1. An oil-in-water insecticidal emulsion consisting essentially of, as an insecticidally active liquid ingredient 1 to 50% by weight of at least one organophosphorus compound having a water-solubility of 1,000 ppm or less at a temperature of 10° C., 2 to 10% by weight of polyvinyl alcohol or gum arabic and 0.1 to 20% by weight of a thickener selected from the group consisting of tragacanth gum, guar gum, sodium alginate, sodium carboxymethyl cellulose, sodium carboxymethyl starch, hydroxyethyl cellulose, methyl cellulose and a polyacrylic acid or a derivative thereof with the balance being water.

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**4,303,641**

## HYDROUS SILICA GEL CONTAINING DENTIFRICE

**Robert B. DeWolf, II, Glen Burnie, and Rimantas Glemza, Baltimore, both of Md., assignors to W. R. Grace & Co., New York, N.Y.**

**Filed May 24, 1978, Ser. No. 909,149**
**Int. Cl.³ A61K *7/16***
**U.S. Cl. 424—49** **25 Claims**

1. A dentifrice composition comprising from about 5 to about 75 weight percent of a humectant and from about 5 to about 50 weight percent of a hydrous silica gel having a water content from about 20 to about 60 weight percent, an average particle size of from about 1 to about 40 microns, and a pH of from about 6 to about 10.

**4,303,642**

## STABLE INSECTICIDE CONTAINING LATEXES, METHOD OF MAKING AND METHOD OF DISTRIBUTING INSECTICIDE

**Donald A. Kangas, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed May 7, 1980, Ser. No. 147,686**
**Int. Cl.³ A61K *31/74, 31/78;* A01N *57/00***
**U.S. Cl. 424—78** **10 Claims**

1. A stable polymer latex comprising chlorpyrifos or chlorpyrifos-methyl dissolved in the polymeric solids of the latex, said polymeric solids comprising polymers and copolymers of styrene, alkyl styrenes, isoprene, butadiene, acrylonitrile, lower alkyl acrylates, vinyl chloride, vinylidene chloride and α,β-ethylenically unsaturated carboxylic acids, including polymers containing three or more different monomer species copolymerized therein, the sizes of the polymeric particles being in the range of from 0.03 to 20 microns.

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**4,303,643**

## SULFONAMIDE COMPOSITIONS

**William W. Armstrong, Mill Neck, N.Y., assignor to Pfizer Inc., New York, N.Y.**

**Continuation of Ser. No. 54,546, Jul. 5, 1979, abandoned. This application Jul. 21, 1980, Ser. No. 170,490**
**Int. Cl.³ A61K *31/79, 31/625, 31/505***
**U.S. Cl. 424—80** **3 Claims**

1. A liquid sulfonamide composition comprising an aqueous solution of from about 10 to 20% w/v of sulfamethoxazole and about 3 to 5% w/v of trimethoprim in from about 60 to 80% w/v of 2-pyrrolidone, said composition having a pH of from about 5 to 9.5.

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**4,303,644**

## FELINE INFECTIOUS PERITONITIS VIRUS VACCINES

**Eldon Davis, Lincoln, Nebr., assignor to Norden Laboratories, Inc., Lincoln, Nebr.**

**Filed Oct. 16, 1979, Ser. No. 85,435**
**Int. Cl.³ A61K *39/12, 39/215***
**U.S. Cl. 424—89** **17 Claims**

1. A live feline infectious peritonitis virus vaccine for oral, intranasal or intraocular administration capable of inducing immunity in animals of the genus Felis, family felidae without serious side effects comprising a vaccinal amount of from about $10^2$ to about $10^4$ $TCID_{50}$/ml of live feline infectious peritonitis virus which, in the undiluted state, can be demonstrated to be infectious for susceptible cats by any known in vitro method or by causing typical feline infectious peritonitis clinical disease symptoms and death when administered by the oral, nasopharyngeal, intramuscular, subcutaneous, intraperitoneal or intravenous routes and which can be serially passed on stable cell lines without exhibiting any change, and a carrier therefor.

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**4,303,645**

## MODIFIED LIVING CANINE PARVOVIRUS VACCINE

**Leland E. Carmichael; Max J. G. Appel, and Douglas D. McGregor, all of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.**

**Filed Apr. 18, 1980, Ser. No. 141,447**
**Int. Cl.³ A61K *39/23***
**U.S. Cl. 424—89** **18 Claims**

1. A method of protecting dogs from infection caused by canine parvovirus comprising inoculating an animal with modified living canine parvovirus vaccine (CPV) prepared in accordance with a procedure which comprises taking a seed of a virulent CPV strain and serially passaging the strain in non-oncogenic cell cultures at a sub-optimal temperature at which CPV growth occurs until a non-virulent, immunizing virus is produced.

4,303,646

## ANTIBIOTIC A/16686 AND PROCESS FOR PREPARATION THEREOF

**Bruno Cavalleri; Hermes Pagani, and Giancarlo Volpe, all of Milan, Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy**

**Filed Mar. 31, 1980, Ser. No. 135,560**

**Claims priority, application United Kingdom, Apr. 7, 1979, 12298/79**

**Int. Cl.³ A61K *35/00***

**U.S. Cl. 424—118** **6 Claims**

1. An antibiotic substance selected from the group consisting of antibiotic A/16686 free base, and its nontoxic, pharmaceutically-acceptable acid addition salts characterized, in the form of its hydrochloride, by:

(A) being a white crystalline material which melts at 224°–226° C.;

(B) being very soluble in water and dimethylformamide; soluble in methanol, ethanol, propanol, and butanol; but insoluble in ethyl ether, petroleum ether, and benzene;

(C) an approximate elemental composition of 51.73 percent carbon, 6.34 percent hydrogen, 9.96 percent nitrogen, 5.84 percent chlorine (total content), 4.74 percent chlorine ions, and 1 percent residue;

(D) an infrared absorption spectrum in nujol with the following observable absorption maxima; (see FIG. 1 of the accompanying drawings): 3290–3070, 2930 and 2860 (nujol), 1765, 1630, 1510, 1455, 1375 (nujol), 1230,1175, 1130, 1065, 1030, 1015, 980, 840, and 820 $cm^{-1}$;

(E) an ultraviolet absorption spectrum with the following absorption maxima (see FIG. 2 of the accompanying drawings):

(a) in methanol:

| |
|---|
| 232 nm ($E^{1\%}_{1cm}$ = 178) |
| 265 nm ($E^{1\%}_{1cm}$ = 107) |

(b) in methanol containing 0.1 N HCl:

| |
|---|
| 231 nm ($E^{1\%}_{1cm}$ = 167) |
| 270 nm ($E^{1\%}_{1cm}$ = 96) |

(c) in methanol containing 0.1 N NaOH:

| |
|---|
| 250 nm ($E^{1\%}_{1cm}$ = 232) |
| 265 nm (shoulder) |

(d) in methanol containing pH 7.38 buffer:

| |
|---|
| 231 nm ($E^{1\%}_{1cm}$ = 167) |
| 270 nm ($E^{1\%}_{1cm}$ = 96) |

(F) a specific rotation, $[\alpha]_D^{24}$, of +49.7° (c=0.43% in DMF)

(G) the following characteristic reactions:

| | |
|---|---|
| ninhydrin (3% ethanolic solution) | negative |
| ninhydrin (3% ethanolic solution + sodium acetate) | positive |
| 1% $FeCl_3$ - 1% $K_3Fe(CN)_6$ | positive (green) |
| Molish | positive |
| Fehling | negative |
| Biuret | positive |
| Anthrone | positive |
| Millon | negative |
| $H_2SO_4$ conc. | negative |
| $KMnO_4$ | positive |

(H) the following $R_f$ values in paper-chromatography on Whatman Nr. 1 paper using *S.aureus ATCC* 6538 as a detection organism:

| | Elution systems | $R_f$ values |
|---|---|---|
| (1) | n-butanol saturated with Sorensen buffer pH 6.0 | 0.00 |
| (2) | n-butanol saturated with water containing 2% of p-toluenesulfonic acid | 0.00 |
| (3) | n-butanol saturated with water containing 2% ammonium hydroxide | 0.00 |
| (4) | Sorensen buffer, pH 6.0, saturated with n-butanol | 0.05 |
| (5) | n-butanol:methanol:water 4:1:2 | 0.43 |
| (6) | ethyl acetate saturated with water | 0.00 |
| (7) | n-butanol:acetic acid:water 2:1:1: | 0.52 |
| (8) | n-butanol:pyridine:water 4:3:7 | 0.87 |

(I) The following $R_f$ values in various thin-layer-chromatographic systems indicated below:

| | Elution system (v/v/v) | $R_f$ values |
|---|---|---|
| (1) | n-propanol:n-butanol:N ammonium hydroxide 2:3:4 (upper phase) | 0.15 |
| (2) | n-butanol:acetic acid:water 4:2:5 | 0.61 |
| (3) | n-butanol:ethanol:0.1 N hydrochloric acid | 0.61 |
| (4) | chloroform:ethanol:10% acetic acid 4:7:2 | 0.00 |
| (5) | n-butanol:acetic acid:water 4:1:5 | 0.17 |
| (6) | methanol:10% aqueous ammonium acetate:10% ammonium hydroxide 10:9:1 | 0.52 |
| (7) | n-butanol:pyridine:water:acetic acid 6:4:3:1 | 0.45 |
| (8) | methanol:10% aqueous ammonium acetate:10% ammonium hydroxide 10:9:1 | 0.11 |
| (9) | 0.25 M aqueous $NaH_2PO_4$:acetonitrile 1:1 | 0.68 |
| (10) | methanol:10% aqueous ammonium acetate 1:1 | 0.65 |
| (11) | n-butanol:acetic acid:water 4:2:5 1 to 7 on Silicagel 60 $Fe_{254}$ plates; 8,9 on Silicagel 60 $F_{254}$ silanised and 10,11 on cellulose F plates | 0.77 |

(J) an amino-acid analysis, after acid hydrolysis in 6 N hydrochloric acid at 110° C. for 6 hours, which indicates the presence of at least the following recognized amino acids: ornithine, aspartic acid, threonine, glycine, alanine, leucine, phenylalanine, p-hydroxy-phenylglycine, and hydroxy, chloro-substituted phenyl-glycine.

4,303,647

## METHOD OF TREATING COCCIDIOSIS WITH ANTIBIOTIC A-32887K

**Robert L. Hamill, Greenwood, and Marvin M. Hoehn, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

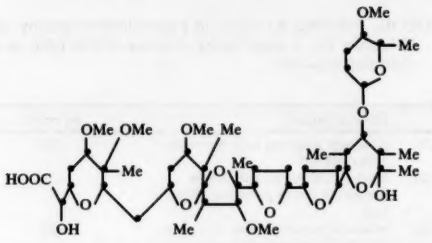
**Continuation-in-part of Ser. No. 14,512, Feb. 23, 1979, abandoned, which is a continuation-in-part of Ser. No. 838,704, Oct. 3, 1977, abandoned, which is a division of Ser. No. 801,876, May 31, 1977, Pat. No. 4,133,876. This application Feb. 22, 1980, Ser. No. 123,851**

**Int. Cl.³ A61K *35/00, 31/35***

**U.S. Cl. 424—121** **9 Claims**

1. A method of treating coccidiosis in poultry which comprises orally administering to poultry in need of said treatment an effective anticoccidial amount of a compound selected from

the group consisting of (1) antibiotic A-32887 which has the following structure:



(2) the acetyl ester derivative of A-32887, which has an approximate empirical formula of $C_{50-51}H_{82-88}O_{18-19}$, and which in its Na-K salt form has a molecular weight of about 988, a melting point of about 127°–129° C., and an approximate $R_f$ value of 0.40 on silica-gel TLC in benzene:ethyl acetate (1:1), and an infrared absorption spectrum as shown in FIG. 4 of the drawings; (3) the n-butyryl ester derivative of A-32887 which has an approximate empirical formula of $C_{52-53}H_{86-92}O_{18-19}$, and which in its Na-K salt form has a molecular weight of about 1016, a melting point of about 59°–62° C., an approximate $R_f$ value of 0.64 on silica-gel TLC in benzene:ethyl acetate (1:1), and an infrared absorption spectrum as shown in FIG. 5 of the drawings; and (4) the pharmaceutically-acceptable salts of antibiotic A-32887 and of the acetyl and n-butyryl ester derivatives of antibiotic A-32887.

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**4,303,648**

## BREATH FRESHENER COMPOSITION AND METHOD

**Frank Witzel, Spring Valley; Mario A. Di Nolfo, Ossining, both of N.Y.; Burton Rodney, Lawrenceville, N.J., and Donald A. M. Mackay, Pleasantville, N.Y., assignors to Life Savers, Inc., New York, N.Y.**

**Filed Apr. 7, 1980, Ser. No. 137,944**

**Int. Cl.³ A61K** *33/08, 31/10, 7/16, 9/68*

**U.S. Cl. 424—158** **12 Claims**

1. A breath freshener composition consisting essentially of a combination of vegetable oil and a substrate comprising magnesium hydroxide or the basic hydrated form of magnesium carbonate, dispersed in a non-toxic carrier, said vegetable oil being present in a weight ratio to the substrate of within the range of from about 0.1:1 to about 0.35:1.

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**4,303,649**

## 1-PHENYL-2-AMINOETHANOL DERIVATIVES

**Geraint Jones, Prestbury, England, assignor to Imperial Chemical Industries Limited, London, England**

**Filed May 29, 1979, Ser. No. 43,425**

**Claims priority, application United Kingdom, Jun. 15, 1978, 27026/78**

**Int. Cl.³ C07C** *103/82*

**U.S. Cl. 424—177** **9 Claims**

1. A 1-phenyl-2-aminoethanol derivative of the formula: $R^1.CH(OH).CH_2.NH.CR^2R^3.A^1.NH.[CO.Y.NH]_n.Q$ wherein $R^1$ is a 3,4-bis[(2-12C) alkanoyloxy]phenyl, 3,5-bis[2-12C)-alkanoyloxy]phenyl, 3-[(2–12 C)alkanoyloxymethyl]-4-[(2–12 C)alkanoyloxy]phenyl or 3,5-dichloro-4-aminophenyl radical; $R^2$ and $R^3$ are independently hydrogen or (1–4 C)alkyl radicals; $A^1$ is a (1–4 C)alkylene diradical; Y is a (1–4 C)alkylene diradical optionally bearing a (1–4 C)alkyl or benzyl substituent; n is an integer from 1 to 4; and Q is a benzoyl, phenylacetyl or phenoxyacetyl radical optionally bearing a nuclear substituent selected from halogeno, (1–4 C)alkyl, (1–4 C)alkoxy and trifluoromethyl radicals; provided that when n is other than 1, Y is the individual diradicals of the formula [CO.Y.NH] may have the same or different values; or a pharmaceutically acceptable acid-addition salt thereof.

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**4,303,650**

## PROCESS FOR PRODUCTION OF ERYTHROPOIETIN

**Kenji Takezawa, Yokohama, and Hajime Hiratani, Osaka, both of Japan, assignors to Ajinomoto Co., Inc., Tokyo and Japan Chemical Research Co., Ltd., Kobe, both of, Japan**

**Filed Oct. 2, 1980, Ser. No. 193,159**

**Claims priority, application Japan, Oct. 9, 1979, 54-130677**

**Int. Cl.³ A61K** *37/00, 35/22;* **C07G** *7/00*

**U.S. Cl. 424—177** **3 Claims**

1. A process for the production of purified erythropoietin from human urine which comprises the steps of

(a) adjusting the value of pH of the urine in the range from 6 to 8, if the pH of the urine is out of this range,

(b) contacting the urine having the thus controlled pH value with an adsorbent selected from the group consisting of a polystyrene-based porous adsorbent resin, chitosan and diatomaceous earth whereby the erythropoietin is adsorbed on the adsorbent,

(c) separating the adsorbent having adsorbed the erythropoietin from the depleted urine, and

(d) eluting the erythropoietin out of the adsorbent.

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**4,303,651**

## HEPARIN FRAGMENTS HAVING SELECTIVE ANTICOAGULATION ACTIVITY

**Ulf P. F. Lindahl, Uppsala; Gudrun E. Bäckström, Alunda; John Y. L. Thunberg, Uppsala; Lars-Ake Fransson, Lund; Lars-Olov Andersson, Knivsta; Erik Y. Holmer, Bromma; Inga H. Sandberg, Sollentuna, and Ewa G. Söderström, Saltsjöbaden, all of Sweden, assignors to Kabi AB, Stockholm, Sweden**

**Filed Jan. 4, 1980, Ser. No. 109,936**

**Claims priority, application Sweden, Jan. 8, 1979, 7900164**

**Int. Cl.³ A61K** *31/725;* **C08B** *37/10*

**U.S. Cl. 424—183** **6 Claims**

4. Pharmaceutical composition for preventative treatment or treatment of arterial thrombosis containing heparin fragments of the structure $(U\text{-}G)_n\text{-}I\text{-}G\text{-}(U\text{-}G)_m$ where n is 1 or 2 and m is 5 or 6, I is unsulphated L-iduronic acid, U is L-iduronic acid-2-O-sulphate and G is N-sulpho-D-glucosamine-6-O-sulphate in an amount sufficient for anticoagulation activity; and a pharmaceutical carrier.

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**4,303,652**

## FIBER-REACTIVE PHOSPHORUS MOTHPROOFING AGENTS

**Francis W. Jones; Robert J. Mayfield, and Gary J. O'Loughlin, all of Geelong, Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Australia**

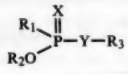
**Filed Aug. 30, 1978, Ser. No. 938,253**

**Claims priority, application Australia, Sep. 6, 1977, PD1533**

**Int. Cl.³ A61K** *31/41, 31/675;* **C07D** *249/12;* **C07F** *9/65*

**U.S. Cl. 424—200** **27 Claims**

1. A compound of the formula:

 (1)

wherein:

X and Y are independently O or S;

$R_1$ is alkyl, alkoxy, alkylamino, dialkylamino or alkylmercapto having 1 to 6 carbon atoms; amino or phenyl;

$R_2$ is alkyl having 1 to 6 carbon atoms;

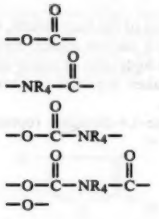
$R_3$ is a group of the formula:

$$-J\text{-}(K\text{-}L)_n \quad (2)$$

wherein:

J is a cyclic group selected from the group consisting of phenyl, naphthyl, pyridyl, pyridazinyl, pyrimidinyl, pyrazinyl, pyrazolyl, imidazolyl, 1,2,4-triazolyl, 1,3,4-thiodizolyl, indazolyl, phthalazinyl, quinoxalinyl, cinnolinyl and isoxazolyl, which cyclic group is linked directly to the group Y and is is linked to the group K by a divalent alkyl group or a divalent alkylmercapto group containing 1 to 4 carbon atoms, said divalent group being linked to the group K through a carbon atom, and said cyclic group being unsubstituted or substituted by substituents selected from the group consisting of halo, cyano, keto, nitro, lower alkylmercapto, cyanoalkylmercapto, lower alkoxy, lower alkyl and lower alkyl substituted with substituents selected from the group consisting of halo, cyano, lower alkylmercapto, lower alkoxy and nitro groups;

K is one of the following groups:



(3)



(4)



(5)



(6)



(7)

linked to J through the oxygen atom in the case of (3), (5) or (6), and through the nitrogen atom in the case of (4), and in which the carbonyl oxygen atom of (3), (4) or (5), or one or both carbonyl oxygen atoms of (6) may be replaced by sulphur; $R_4$ is hydrogen, an aryl group having 6 to 10 carbon atoms, or an alkyl group of 1 to 6 carbon atoms;

L is a halogenated alkyl or alkenyl group, an alkyl group having 1 to 4 carbon atoms or an aryl group having 6 to 10 carbon atoms substituted with a vinylsulphonyl group, vinylsulphonamido group or a group capable of forming vinylsulphonyl or vinylsulphonylamido groups, or a 6-membered nitrogen heterocyclic group containing 2 to 3 nitrogen atoms and having attached to carbon atoms adjacent to a nitrogen atom of the ring 1 to 4 halogen atoms, and optionally being further substituted by substituents selected from the group consisting of cyano, an alkyl or alkoxy group containing 1 to 4 carbon atoms, an aryl, aryloxy, arylamino or arylsulphonyl group containing 6 to 10 carbon atoms, trifluoromethyl, amino, an alkylamino, dialkylamino or alkylsulphonyl group wherein the alkyl contains 1 to 4 carbon atoms and quaternary ammonium groups; the ring being linked directly to K or through an alkylene group having 1 to 4 carbon atoms;

n is 1 to 3.

**2.** A mothproofing composition comprising an effective amount of a compound of formula I as defined in claim **1** in an appropriate liquid carrier.

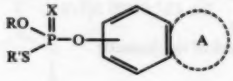
**4,303,653**

## ORGANIC PHOSPHORIC ACID ESTER DERIVATIVES, A PROCESS FOR PREPARING THE SAME AND INSECTICIDAL, MITICIDAL OR NEMATOCIDAL COMPOSITIONS CONTAINING THE SAME

**Isao Chiyomaru; Hidetoshi Sugiyama, both of Shimizu; Koyata Niita, Fujieda; Kunihiko Fujimori, Shimizu; Tadayoshi Hirano, and Osamu Tada, both of Shizuoka, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan**

**Filed Jun. 27, 1981, Ser. No. 163,662**
**Claims priority, application Japan, Jun. 27, 1979, 54-80236**
**Int. Cl.³ C07D** *311/70, 311/04;* **A61K** *31/665*
**U.S. Cl. 424—203** **9 Claims**

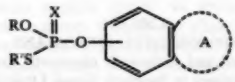
**1.** An organic phosphoric acid ester compound represented by the formula (I)



(I)

wherein R and R', which may be the same or different, each represents an alkyl group; X represents an oxygen atom or a sulfur atom; and A represents a group of atoms necessary to complete together with the two atoms to which they are attached, a 6-membered heterocyclic ring containing an oxygen atom as the hetero atom, said heterocyclic ring being unsubstituted or substituted with 1 to 5 alkyl groups.

**9.** A process for controlling insects, mites or nematodes which comprises applying to an area or crop subject to said insect, mites or nematodes a composition containing at least one organic phosphoric acid ester represented by the formula (I)



(I)

wherein R, R', X and A have the same meaning as in claim **1**.

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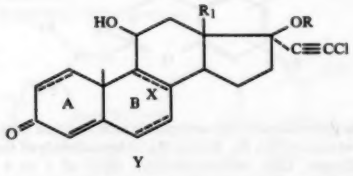
**4,303,654**

## NOVEL 21-CHLORO-20-ACETYLENIC STEROIDS

**Roger Deraedt, Pavillons-sous-Bois; Jean G. Teutsch, Pantin, and Germain Costerousse, Saint-Maurice, all of France, assignors to Roussel Uclaf, Paris, France**

**Filed Oct. 9, 1980, Ser. No. 195,647**
**Claims priority, application France, Oct. 26, 1979, 79 26625**
**Int. Cl.³ A01N** *45/00;* **A61K** *31/56*
**U.S. Cl. 424—243** **24 Claims**

**1.** A 21-chloro-20-acetylenic steroid of the formula



Y

wherein $R_1$ is alkyl of 1 to 3 carbon atoms, R is selected from the group consisting of hydrogen and acyl of an organic carboxylic acid of 1 to 18 carbon atoms, X is selected from the group consisting of hydrogen, chlorine, bromine and fluorine, Y is selected from the group consisting of hydrogen, fluorine and methyl and the dotted lines in the A and B rings are one or two optional double bonds in the 1(2) and 6(7) positions with

the proviso that Y is not hydrogen when $R_1$ is methyl, X is hydrogen, the A ring is saturated in the 1(2) position and the B ring is saturated.

17. A method of treating inflammation in warm-blooded animals comprising administering to warm-blooded animals an anti-inflammatorily effective amount of at least one compound of claim 1.

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## 4,303,655
## 3,7-DISUBSTITUTED-3-CEPHEM-4-CARBOXYLIC ACID COMPOUNDS

**Takashi Kamiya, Saita; Kunihiko Tanaka, Toyonaka; Yoshiharu Nakai, Otsu, and Kazuo Sakane, Amagasaki, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

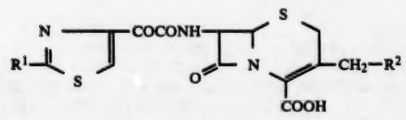
**Filed Feb. 28, 1977, Ser. No. 772,734**

**Claims priority, application United Kingdom, Mar. 9, 1976, 9425/76; Oct. 4, 1976, 41145/76**

**Int. Cl.³ C07D *501/36***

**U.S. Cl. 424—246** **12 Claims**

1. The compound of the formula:



wherein

$R^1$ is amino, ($C_1$ to $C_6$)alkylamino, an amino group protected by an eliminatable protective acyl group or hydroxy, and

$R^2$ is triazolylthio, tetrazolylthio, thiadiazolylthio or oxadiazolylthio wherein each of which may have a ($C_1$ to $C_6$)alkyl, and

pharmaceutically acceptable salt thereof.

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## 4,303,656
## AMINOMETHYL CHROMANS

**John T. Sime, Ewell, and Anthony T. Ainsworth, Cranleigh, both of England, assignors to Beecham Group Limited, England**

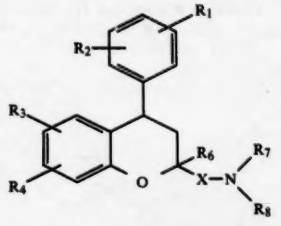
**Filed May 1, 1980, Ser. No. 145,856**

**Claims priority, application United Kingdom, May 19, 1979, 17495/79**

**Int. Cl.³ A61K *31/35;* C07D *311/58, 413/00, 405/06***

**U.S. Cl. 424—248.4** **11 Claims**

1. A compound selected from the group consisting of a chroman of the formula:



and the pharmaceutically acceptable acid addition salts thereof wherein each of $R_1$, $R_2$, $R_3$ and $R_4$, independently of the others is hydrogen, halo, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, hydroxy, carboxy, alkoxycarbonyl of 1 to 4 carbon atoms in the alkoxy group, amino or acetamido;

$R_6$ is hydrogen or alkyl of 1 to 4 carbon atoms;

X is straight or branched chain alkylene of up to 4 carbon atoms, and each of

$R_7$ and $R_8$, when taken independently, is hydrogen or alkyl of 1 to 4 carbon atoms or $R_7$ and $R_8$ when taken together with the nitrogen atom to which they are attached, are piperidino or morpholino.

10. A pharmaceutical composition comprising an anorexically effective amount of a compound according to claim 1 in combination with a pharmaceutical carrier.

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## 4,303,657
## NITROHYDROXYALKYL-SUBSTITUTED QUINOXAXILINE DIOXIDES AND ALKANOIC ACID ESTERS THEREOF

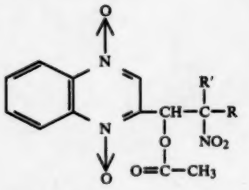
**Vernon V. Young; Robert D. Williams, and Richard E. Ivy, all of Terre Haute, Ind., assignors to International Minerals & Chemical Corp., Terre Haute, Ind.**

**Filed May 21, 1979, Ser. No. 40,836**

**Int. Cl.³ C07D *241/42, 241/52;* A61K *31/495***

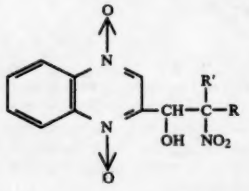
**U.S. Cl. 424—250** **23 Claims**

1. A method of promoting the growth rate of animals comprising administering to them daily in their feed rations a compound of the formula



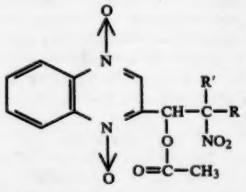
in an amount of from 50 to 150 g/ton of the feed rations, where R is hydrogen, lower alkyl of 1–3 carbon atoms, hydroxymethyl or acetoxymethyl and R′ is hydrogen or lower alkyl of 1–2 carbon atoms, or R and R′ taken together constitute an alkylene group of 5 carbon atoms.

2. Nitrohydroxyalkylquinoxaline-1,4-dioxides represented by the formula



where R is hydrogen, lower alkyl of 1–3 carbon atoms, hydroxymethyl or acetoxymethyl and R′ is hydrogen or lower alkyl of 1–2 carbon atoms or R and R′ taken together constitute an alkylene group of five carbon atoms.

3. Compounds represented by the formula



where R is hydrogen, lower alkyl of 1–3 carbon atoms, hydroxymethyl or acetoxymethyl and R′ is hydrogen or lower alkyl of 1–2 carbon atoms or R and R′ taken together constitute an alkylene group of five carbon atoms.

14. A method of promoting the growth rate of animals

comprising administering to them daily in their feed rations a compound of claim 2 in an amount of from 50 to 150 g/ton of the feed rations.

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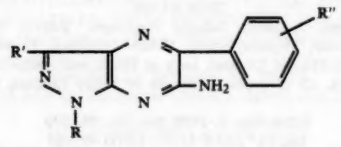
4,303,658

## ANTIVIRAL PYRAZOLOPYRAZINES

Gerard Y. Paris, Laval, Canada; Mina D. Perlin, Highland Park, Ill.; Andre G. Pernet, Evanston, Ill., and Nathan L. Shipkowitz, Waukegan, Ill., assignors to Abbott Laboratories, North Chicago, Ill.

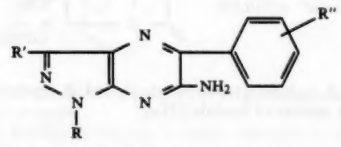
Filed May 12, 1980, Ser. No. 148,637
Int. Cl.[3] C07D *487/04;* A61K *31/495*
U.S. Cl. 424—250 12 Claims

1. A compound of the formula



wherein R is loweralkyl, R′ is hydrogen or loweralkyl, and R″ is hydrogen, loweralkyl, loweralkyloxy, halogen or nitro.

4. A pharmaceutical composition in dosage form containing, as the active principle, an antivirally effective amount of a compound of the formula



wherein R is loweralkyl, R′ is hydrogen or loweralkyl, and R″ is hydrogen, loweralkyl, loweralkyloxy, halogen or nitro, together with a pharmaceutically acceptable diluent.

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4,303,659

## SCHISTOSOMICIDAL COMPOSITIONS

Keith W. Brammer, and John R. Shaw, both of Canterbury, England, assignors to Pfizer Inc., New York, N.Y.

Filed Aug. 13, 1980, Ser. No. 177,687
Claims priority, application United Kingdom, Aug. 22, 1979, 29246/79
Int. Cl.[3] A61K *31/495, 31/47*
U.S. Cl. 424—250 5 Claims

1. A schistosomicidal composition comprising a compound (A) which is dl-6-hydroxymethyl-2-isopropylaminomethyl-7-nitro-1,2,3,4-tetrahydroquinoline or a pharmaceutically acceptable acid addition salt thereof and a compound (B) which is 2-cyclohexylcarbonyl-4-oxo-1,2,3,6,7,11b-hexahydro-4H-pyrazino [2,1*a*]isoquinoline wherein the weight ratio of the free base of compound (A) to the free base of compound (B) is in the range of from about 1.0:0.5 up to about 1.0:5.0.

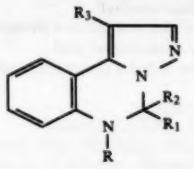
4,303,660

## PYRAZOLO[1,5-C]QUINAZOLINE DERIVATIVES AND ANALGESIC COMPOSITIONS CONTAINING THEM

Edit Berenyi née Poldermann; Eniko Szirt née Kiszelly; Peter Görög; Lujza Petocz; Ibolya Kosóczky; Ágnes Kovács née Palotai, and Gabriella Ürmös née Lassu, all of Budapest, Hungary, assignors to Egyt Gyogyszervegyeszeti Gyar, Budapest, Hungary

Filed May 16, 1980, Ser. No. 150,349
Claims priority, application Hungary, May 18, 1979, EE 2663
Int. Cl.[3] A61K *31/505;* C07D *487/04*
U.S. Cl. 424—251 16 Claims

1. A pyrazolo quinazoline of the formula



wherein

R represents a hydrogen atom, a $C_{1-4}$ alkyl group or a $C_{1-4}$ alkanoyl group,

$R_1$ is a hydrogen atom, a $C_{1-12}$ alkyl group, a $C_{3-8}$ cycloalkyl group, a $C_{2-4}$ alkenyl group, a phenylalkenyl group, wherein the alkenyl group has 2 to 4 carbon atoms, a carboxy group or a phenyl group optionally substituted by a halogen atom, a nitro group, a hydroxy group, a $C_{1-4}$ alkoxy group or a di($C_{1-4}$ alkyl)amino group, or

R and $R_1$ may form together a valence bond,

$R_2$ represents a hydrogen atom, a $C_{1-4}$ alkyl or a phenyl group, or

$R_1$ and $R_2$ may form together a $C_{2-7}$ alkylene group,

$R_3$ represents a nitro group, an amino group, an alkanoylamino group, wherein the alkanoyl group has 1 to 4 carbon atoms, a benzylideneimino group or an alkylideneimino group, wherein the alkylidene group has 1 to 4 carbon atoms,

and pharmaceutically acceptable acid addition salts thereof.

16. An analgesic composition comprising an analgesically effective amount of a compound of claim 1 and a pharmaceutical carrier.

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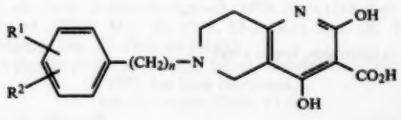
4,303,661

## BENZYL-TETRAHYDRO-2,4-DIHYDROXY-1,6-NAPHTHYRIDINE-3 CARBOXYLIC ACID TYPE ANTIALLERGY AGENTS

Stanley C. Bell, Narberth, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Oct. 17, 1980, Ser. No. 197,843
Int. Cl.[3] A61K *31/495;* C07D *471/04*
U.S. Cl. 424—256 12 Claims

1. A compound of the formula:



in which

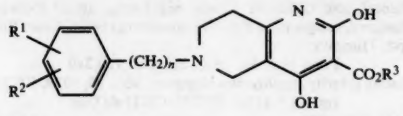
$R^1$ and $R^2$ are, independently, hydrogen, alkyl of 1 to 3 carbon atoms, halo or trifluoromethyl; and

n is one of the integers 1, 2 or 3;

or a pharmaceutically acceptable salt thereof.

9. A method for prophylactically treating a sensitized mammal to prevent the symptoms manifest in an immediate hyper-

sensitivity reaction between reaginic type antibodies and an antigen which comprises administering to said mammal an effective amount of a compound of the fomrula:



in which

$R^1$ and $R^2$ are, independently, hydrogen, alkyl of 1 to 3 carbon atoms, halo, or trifluoromethyl;

$R^3$ is hydrogen, alkyl of 1 to 6 carbon atoms or a pharmaceutically acceptable metal or amine cation; and

n is one of the integers 1, 2 or 3; and a pharmaceutical carrier.

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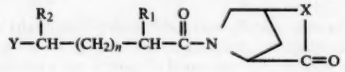
**4,303,662**

## CARBOXYACYL, MERCAPTO AND ACYLMERCAPTO DERIVATIVES OF HETEROBICYCLO COMPOUNDS

**Peter W. Sprague, Pennington, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Nov. 24, 1980, Ser. No. 209,780**
**Int. Cl.³ A61K *31/435, 31/40;* C07D *491/08***
**U.S. Cl. 424—256** **15 Claims**

**1.** A compound of the formula



wherein

$R_1$ is hydrogen, lower alkyl, phenyl lower alkyl or halo substituted lower alkyl;

$R_2$ is hydrogen, lower alkyl, phenyl lower alkyl or halo substituted lower alkyl;

n is 0, 1 or 2;

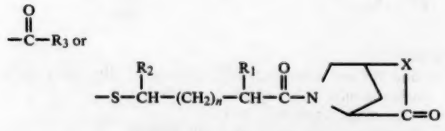
X is $-(CH_2)_mZ-$;

Z is oxygen, sulfur or imino;

m is 0 or 1;

Y is S—R or

R is hydrogen, lower alkyl,



$R_3$ is lower alkyl, phenyl or phenyl lower alkyl;

and $R_4$ is hydroxy, amino, hydroxyamino or lower alkoxy.

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**4,303,663**

## BUTYROPHENONE COMPOUNDS

**Kikuo Sasajima, Toyonaka; Keiichi Ono, Nishinomiya; Masaru Nakao, Toyonaka, and Hisao Yamamoto, Hyogo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Division of Ser. No. 568,819, Apr. 17, 1975, Pat. No. 4,039,670. This application May 9, 1977, Ser. No. 795,145**
**Claims priority, application Japan, Apr. 18, 1974, 49-44181**
**Int. Cl.³ C07D *211/52;* A61K *31/445***
**U.S. Cl. 424—267** **4 Claims**

**1.** 1-[γ-(2-Lower alkyl-4-halobenzoyl)propyl]-4-(3-trifluoromethylphenyl)-4-hydroxypiperidine, or a pharmaceutically acceptable acid addition salt thereof.

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**4,303,664**

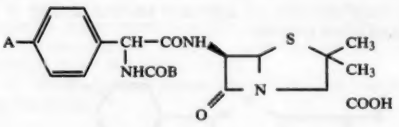
## NOVEL PENICILLIN DERIVATIVES CONTAINING A COUMARIN NUCLEUS AND MEDICINES CONTAINING THE SAME

**Syoji Ono, Kodaira; Takashi Sugiyama, Tokyo; Yoshiko Kawakami, Higashiyamato; Yataro Ichikawa, Fuchu; Yoji Suzuki; Hitoshi Ohmori, both of Hino, and Akiko Azuma, Kodaira, all of Japan, assignors to Teijin Limited, Osaka, Japan**

**Filed Mar. 8, 1978, Ser. No. 884,509**
**Int. Cl.³ A61K *31/43;* C07D *499/68***
**U.S. Cl. 424—271** **6 Claims**

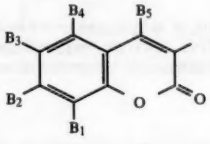
**1.** Novel penicillin derivatives of formula [I]

[I]



wherein A is hydrogen or hydroxyl, and B represents the coumarin nucleus of formula [III-a]

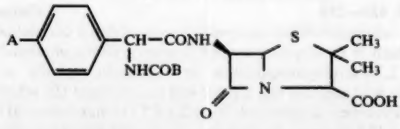
[III-a]



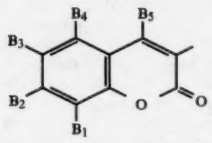
in which $B_1$, $B_2$, $B_3$, $B_4$ and $B_5$ are the same or different, and are selected from the group consisting of hydrogen, hydroxyl, thiol, acetyl, acetyloxy, amino, carboxyl, chloro, bromo, alkoxy of 1 to 4 carbon atoms, alkylmercapto of 1 to 4 carbon atoms, alkylamino of 1 to 8 carbon atoms, alkoxycarbonyl of 2 to 5 carbon atoms and nontoxic carboxylic salt, or nontoxic salts thereof.

**4.** Bactericides containing a bactericidally effective amount of a novel penicillin derivative of formula [I]

[I]



wherein A is hydrogen or hydroxyl, and B represents the coumarin nucleus of formula [III-a]



[III-a]

in which $B_1$, $B_2$, $B_3$, $B_4$ and $B_5$ are same or different, and are selected from the group consisting of hydrogen, hydroxyl, thiol, acetyl, acetyloxy, amino, carboxyl, chloro, bromo, alkoxy of 1 to 4 carbon atoms, alkylmercapto of 1 to 4 carbon atoms, alkylamino of 1 to 8 carbon atoms, alkoxycarbonyl of 2 to 5 carbon atoms and nontoxic carboxyl salt, or nontoxic salts thereof as a main ingredient and a nontoxic carrier.

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**4,303,665**

**METHYLAMINODEOXY-CLAVULANIC ACID DERIVATIVES, THEIR PRODUCTION AND USE**

**John B. Harbridge, Coulsdon, England, assignor to Beecham Group Limited, England**

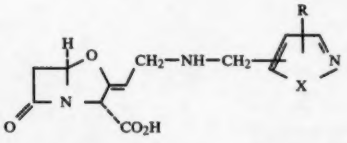
**Filed Sep. 27, 1979, Ser. No. 79,557**

**Claims priority, application United Kingdom, Oct. 27, 1978, 42338/78**

**Int. Cl.³ C07D *498/04;* A61K *31/42***

**U.S. Cl. 424—272** **30 Claims**

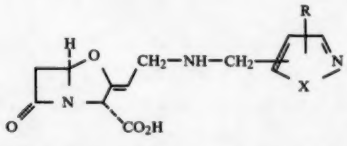
**1.** A compound of the formula (II):



(II)

wherein X is sulphur or oxygen and R is hydrogen or alkyl of 1–3 carbon atoms.

**5.** A method of treating bacterial infections in mammals includin~ humans which comprises administering to such a mammal .n need thereof an antibacterially effective amount of a compound of the formula (II):



(II)

wherein X is sulphur or oxygen and R is hydrogen or alkyl of 1–3 carbon atoms in combination with a pharmaceutically acceptable carrier.

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**4,303,666**

**5-PHENYLSELENO-2-BENZIMIDAZOLE CARBAMATES**

**Anthony P. Flynn, Great Budworth, England, assignor to Imperial Chemical Industries Limited, London, England**

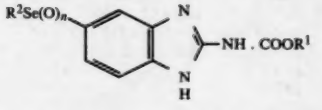
**Filed Oct. 7, 1980, Ser. No. 194,932**

**Claims priority, application United Kingdom, Oct. 12, 1979, 35502/79**

**Int. Cl.³ A61K *31/415;* C07D *235/32***

**U.S. Cl. 424—273 B** **9 Claims**

**1.** A compound of the formula:



I

wherein $R^1$ is 1–6C alkyl, $R^2$ is phenyl optionally bearing one or more halogen, cyano, trifluoromethyl or 1–6C alkyl or 1–6C alkoxy substituents, and n is 0, 1 or 2.

**9.** A method of combatting helminth or Fasciola infestations in domestic animals which comprises administering to such animals exposed to such infestations an anthelmintically or fasciolicidally effective amount of a compound as claimed in claim **1**.

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**4,303,667**

**PHENYLPRROLE DERIVATIVES**

**Akiyoshi Ueda, Hiratsuka; Shigeru Kojima, Odawara; Yasushi Yasuda, Yokohama; Hiroaki Nishikawa, Oisomachi, and Akira Nakada, Shizuoka, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan**

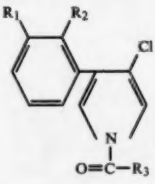
**Filed Apr. 9, 1980, Ser. No. 138,502**

**Claims priority, application Japan, May 25, 1979, 54-64793; Jun. 4, 1979, 54-69570; Jul. 25, 1979, 54-94728**

**Int. Cl.³ C07D *207/30***

**U.S. Cl. 424—274** **15 Claims**

**1.** A compound of the general formula



wherein

$R_1$ is hydrogen or chlorine

$R_2$ is hydrogen, chlorine or nitro, and

$R_3$ is hydrogen or methoxymethyl,

with the proviso that $R_1$ and $R_2$ do not represent hydrogen simultaneously.

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**4,303,668**

**ANTIBACTERIAL AND ANTIFUNGAL COMPOSITION**

**Masayasu Hasegawa, Kyoto; Hideo Nishikawa, Ibaraki, and Yasuo Kotani, Hirakata, all of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 58,448, Jul. 18, 1979, Pat. No. 4,242,386. This application May 20, 1980, Ser. No. 151,653**

**Claims priority, application Japan, Dec. 26, 1978, 53-161816; Dec. 26, 1978, 53-161817; Dec. 26, 1978, 53-161818; Dec. 26, 1978, 53-161819; Dec. 26, 1978, 53-161820; Dec. 26, 1978, 53-161821; Dec. 26, 1978, 53-161822**

**The portion of the term of this patent subsequent to Dec. 30, 1997, has been disclaimed.**

**Int. Cl.³ A01N *37/34, 43/02***

**U.S. Cl. 424—279** **1 Claim**

**1.** An antibacterial and antifungal composition comprising a mixture of:

(A) at least one member selected from the group consisting of dehydroacetic acid, and its alkali metal salts; and

(B) tetrachloroisophthalonitrile, wherein the weight ratio of component (A) to component (B) is in the range of 95/5 to 60/40.

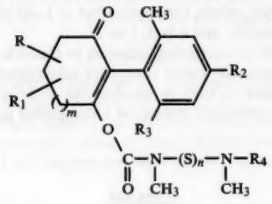
4,303,669

# HYBRID 1,3-DIONE-CARBAMATE COMPOUNDS

Themistocles D. J. D'Silva, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

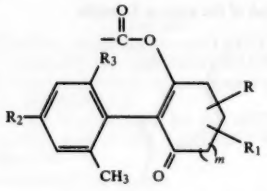
Filed Mar. 25, 1980, Ser. No. 133,750
Int. Cl.[3] A01N 43/16, 43/08; C07D 317/44, 307/77
U.S. Cl. 424—282 48 Claims

1. Compounds of the formula:



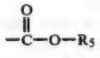
wherein:
m=0 or 1;
n=1 or 2;
R, $R_1$, $R_2$, and $R_3$ are individually hydrogen or alkyl groups of one to four carbon atoms;
$R_4$ is:
(a) fluorocarbonyl or
(b) a group of the formula:

A.



wherein R, $R_1$, $R_2$, $R_3$ and m have the above indicated values;

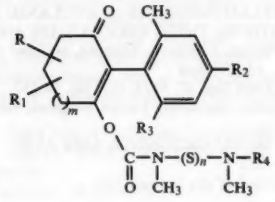
B.



wherein $R_5$ is:
(1) a phenyl group which is unsubstituted or substituted with one or more $C_1$–$C_{12}$ alkyl, chloro, fluoro, bromo, alkoxy, alkylthio, alkylthioalkyl, alkylsulfinyl, alkylsulfinylalkyl, alkylsulfonyl, alkylsulfonylalkyl, alkynyloxy, dialkylamino, alkoxyamino, formamidino, cyano, dioxolanyl or dithiolanyl group in any combination; or
(2) a naphthyl, tetrahydronaphthyl, dihydrobenzofuranyl, benzodioxalanyl, or benzothienyl group, all of which is unsubstituted or substituted with one or more alkyl groups; or
(3) a group of the formula:

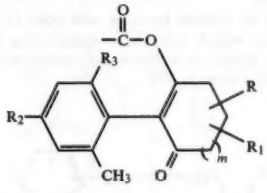
wherein $R_6$ is a chloro, alkyl, alkylthio, cyanoalkylthio, amidoalkylthio or cyano group; or $R_6$ is hydrogen provided $R_7$ is not hydrogen;
$R_7$ is an alkyl, alkylthio, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylthioalkyl, cyanoalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl, alkoxyalkyl, nitroalkyl, hydroxyalkyl, or phenyl group, said phenyl group is unsubstituted or substituted with one or more alkyl, chloro, or fluoro groups in any combination; or $R_7$ is hydrogen, provided $R_6$ is not hydrogen; or
(4) cyclic oximes selected from the group consisting of 2-oximino-1,4-dithianes, 2-oximino-1,3-dithianes, 4-oximino-1,3-dithiolanes, 2-oximino-1,4-dioxanes, 2-oximino-tetrahydro-1,4-thiazine-3-ones, 2-oximino-1,3-dihiolanes, 2-imino-4-oximino-1,3-dithiolanes, 3-oximinothiophanes, 2-oximinothiophanes, 2-oximino-tetrahydro-1,4-oxazine-3-ones, 2-oximino-1,4-oxathianes, 4-oximino-1,3-oxathiolanes, 2-oximino-thiazolidin-3-ones, 2-oximino-1,3-thiazolidin-4-ones or 2-oximino-tetrahydro-1,4-thiazin-5-ones, each of which is unsubstituted or substituted with one to four alkyl groups and wherein sulfur can be in any of its oxidation states.

17. An insecticidal and acaricidal composition comprising an acceptable carrier and as the active toxicant an insecticidally and acaricidally effective amount of a compound of the formula:



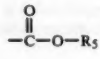
wherein:
m=0 or 1;
n=1 or 2;
R, $R_1$, $R_2$, and $R_3$ are individually hydrogen or alkyl groups of one to four carbon atoms;
$R_4$ is:
(a) fluorocarbonyl or
(b) a group of the formula:

A.

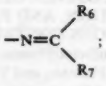


wherein R, $R_1$, $R_2$, $R_3$ and m have the above indicated values;

B.



wherein $R_5$ is:
(1) a phenyl group which is unsubstituted or substituted with one or more $C_1$–$C_{12}$ alkyl, chloro, fluoro, bromo, alkoxy, alkylthio, alkylthioalkyl, alkylsulfinyl, alkylsulfinylalkyl, alkylsulfonyl, alkylsulfonylalkyl, alkynyloxy, dialkylamino, alkoxyamino, formamidino, cyano, dioxolanyl or dithiolanyl group in any combination; or
(2) a naphthyl, tetrahydronaphthyl, dihydrobenzofuranyl, benzodioxalanyl, or benzothienyl group, all of which is unsubstituted or substituted with one or more alkyl groups; or
(3) a group of the formula:

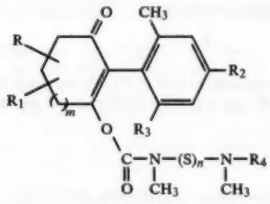


wherein $R_6$ is a chloro, alkyl, alkylthio, cyanoalkylthio, amidoalkylthio or cyano group; or $R_6$ is hydrogen provided $R_7$ is not hydrogen;

$R_7$ is an alkyl, alkylthio, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylthioalkyl, cyanoalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl, alkoxyalkyl, nitroalkyl, hydroxyalkyl, or phenyl group, said phenyl group is unsubstituted or substituted with one or more alkyl, chloro, or fluoro groups in any combination; or $R_7$ is hydrogen, provided $R_6$ is not hydrogen; or

(4) cyclic oximes selected from the group consisting of 2-oximino-1,4-dithianes, 2-oximino-1,3-dithianes, 4-oximino-1,3-dithiolanes, 2-oximino-1,4-dioxanes, 2-oximino-tetrahydro-1,4-thiazine-3-ones, 2-oximino-1,3-dithiolanes, 2-imino-4-oximino-1,3-dithiolanes, 3-oximinothiophanes, 2-oximinothiophanes, 2-oximinotetrahydro-1,4-oxazine-3-ones, 2-oximino-1,4-oxathianes, 4-oximino-1,3-oxathiolanes, 2-oximino-thiazolidin-3-ones, 2-oximino-1,3-thiazolidin-4-ones or 2-oximino-tetrahydro-1,4-thiazin-5-ones, each of which is unsubstituted or substituted with one to four alkyl groups and wherein sulfur can be in any of its oxidation states.

33. A method of controlling insects and acarids which comprises subjecting them to an insecticidally and acaricidally effective amount of a compound of the formula:



wherein:

m=0 or 1;

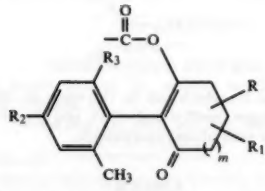
n=1 or 2;

R, $R_1$, $R_2$, and $R_3$ are individually hydrogen or alkyl groups of one to four carbon atoms;

$R_4$ is:

(a) fluorocarbonyl or

(b) a group of the formula:

A. 

wherein R, $R_1$, $R_2$, $R_3$ and m have the above indicated values;

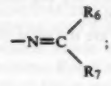
B.

wherein $R_5$ is:

(1) a phenyl group which is unsubstituted or substituted with one or more $C_1$-$C_{12}$ alkyl, chloro, fluoro, bromo, alkoxy, alkylthio, alkylthioalkyl, alkylsulfinyl, alkylsulfinylalkyl, alkylsulfonyl, alkylsulfonylalkyl, alkynyloxy, dialkylamino, alkoxyamino, formamidino, cyano, dioxolanyl or dithiolanyl group in any combination; or

(2) a naphthyl, tetrahydronaphthyl, dihydrobenzofuranyl, benzodioxalanyl, or benzothienyl group, all of which is unsubstituted or substituted with one or more alkyl groups; or

(3) a group of the formula:



wherein $R_6$ is a chloro, alkyl, alkylthio, cyanoalkylthio, amidoalkylthio or cyano group; or $R_6$ is hydrogen provided $R_7$ is not hydrogen;

$R_7$ is an alkyl, alkylthio, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylthioalkyl, cyanoalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl, alkoxyalkyl, nitroalkyl, hydroxyalkyl, or phenyl group, said phenyl group is unsubstituted or substituted with one or more alkyl, chloro, or fluoro groups in any combination; or $R_7$ is hydrogen, provided $R_6$ is not hydrogen; or

(4) cyclic oximes selected from the group consisting of 2-oximino-1,4-dithianes, 2-oximino-1,3-dithianes, 4-oximino-1,3-dithiolanes, 2-oximino-1,4-dioxanes, 2-oximino-tetrahydro-1,4-thiazine-3-ones, 2-oximino-1,3-dithiolanes, 2-imino-4-oximino-1,3-dithiolanes, 3-oximinothiophanes, 2-oximinothiophanes, 2-oximino-tetrahydro-1,4-oxazine-3-ones, 2-oximino-1,4-oxathianes, 4-oximino-1,3-oxathiolanes, 2-oximino-thiazolidin-3-ones, 2-oximino-1,3-thiazolidin-4-ones or 2-oximino-tetrahydro-1,4-thiazin-5-ones, each of which is unsubstituted or substituted with one to four alkyl groups and wherein sulfur can be in any of its oxidation states.

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**4,303,670**

## BICYCLIC PROSTAGLANDINS AND PROCESS FOR THEIR PREPARATION

**Carmelo Gandolfi, Milan; Carlo Passarotti, Gallarate; Alessandro Andreoni, Cologno; Angelo Fumagalli, Monza; Franco Faustini, Milan; Roberto Ceserani, Milan, and Maria M. Usardi, Milan, all of Italy, assignors to Farmitalia Carlo Erba, Milan, Italy**

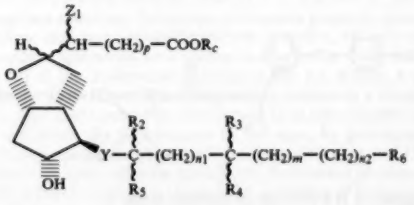
**Division of Ser. No. 920,166, Jun. 29, 1978, which is a division of Ser. No. 859,703, Dec. 12, 1977, abandoned. This application Apr. 13, 1979, Ser. No. 29,925**

**Claims priority, application Italy, Dec. 31, 1976, 31041 A/76; Jan. 14, 1977, 19283A/77; Mar. 14, 1977, 21171 A/77; Mar. 21, 1977, 21412 A/77; Mar. 31, 1977, 21863 A/77**

**Int. Cl.**[3] **A61K** *31/557;* **C07D** *307/935;* **A61K** *31/34*

**U.S. Cl. 424—285** **34 Claims**

1. A compound of the formula

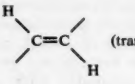


wherein

$R_c$ is H,$C_1$-$C_{12}$ alkyl or $C_2$-$C_{12}$ alkenyl;

$Z_1$ is hydrogen or bromine;

p is zero an integer of 1 to 7,
Y is $-CH_2-CH_2-$ or




one of $R_2$ and $R_5$ is hydrogen or $C_1$–$C_6$ alkyl and the other is hydroxy;
each of $R_3$ and $R_4$, which are the same or different, may be hydrogen or $C_1$–$C_6$ alkyl;
each of $n_1$ and $n_2$ which are the same or different is zero or an integer of 1 to 6;
m is zero or 1;
$R_6$ is a $C_3$–$C_9$-cycloalkyl radical or a $C_3$–$C_9$-cycloalkenyl radical, unsubstituted or substituted by one or more substituents selected from the group consisting of $C_1$–$C_6$ alkyl and $C_1$–$C_6$ alkoxy, and the pharmaceutically or veterinarily acceptable salts thereof.

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**4,303,671**

## ALBUMIN STABILIZED PROSTACYCLIN

**Francis A. Fitzpatrick, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Filed Jul. 10, 1980, Ser. No. 168,846**
**Int. Cl.³ A61K** *31/34*
**U.S. Cl. 424—285** **4 Claims**

1. In a method consisting essentially of administering prostacyclin to a mammal in a formulation suitable for parenteral administration, the improvement which comprises:
employing as an excipient in said formulation in a pharmaceutically acceptable, stabilizing concentration albumin derived from serum obtained from the species of which said mammal is a member.

2. In a composition consisting essentially of a formulation of prostacyclin suitable for parenteral administration, the improvement which comprises:
albumin derived from serum obtained from the species of which said mammal is a member, employed as an excipient in said formulation in a pharmaceutically acceptable, stabilizing concentration.

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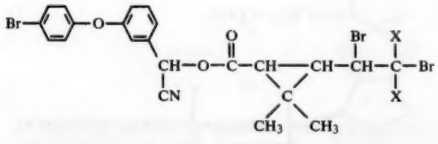
**4,303,672**

## CYCLOPROPANECARBOXYLATE INSECTICIDES AND/OR ACARICIDES EXHIBITING LOW TOXICITY TO MAMMALS AND FISH

**Masachika Hirano, Ibaraki; Tadashi Ohsumi, Kyoto; Kiyoshi Kasamatsu, Takarazuka, and Takashi Kato, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Filed Feb. 21, 1980, Ser. No. 123,455**
**Claims priority, application Japan, Feb. 27, 1979, 54-22972**
**Int. Cl.³ A01N** *53/00*; **C07C** *121/75*
**U.S. Cl. 424—304** **9 Claims**

1. A compound of the formula,




wherein X is a chlorine or bromine atom.

7. A method for controlling an insect and/or acarid which comprises applying an insecticidally and/or acaricidally effective amount of compound according to claim 1 to the insect and/or acarid.

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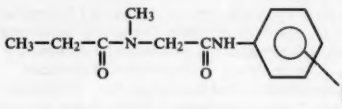
**4,303,673**

## N-PROPIONYLSARCOSINEANILIDES, PROCESS FOR THEIR PREPARATION, AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

**Jürgen Biedermann, Pulheim-Stommeln; Armin Wendel, Cologne; Hans Betzing, Horrem, and Volker Neuser, Bergheim-Ahe, all of Fed. Rep. of Germany, assignors to A. Nattermann & Cie. GmbH, Cologne, Fed. Rep. of Germany**

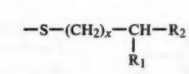
**Filed Sep. 5, 1980, Ser. No. 184,309**
**Claims priority, application Fed. Rep. of Germany, Sep. 18, 1979, 2937698**
**Int. Cl.³ A61K** *31/165, 31/40, 31/24*; **C07C** *103/20*
**U.S. Cl. 424—324** **9 Claims**

1. N-Propionylsarcosineanilides of the formula:



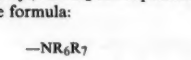

I

wherein n is an integer which can vary from 1 to about 3 and the substituent A which can be the same or different when n is greater than 1 is selected from the group consisting of trifluoromethyl; halogen; nitro; acetyl; a straight-chain or branched alkyl group having 1 to about 4 carbon atoms; a straight-chain or branched alkoxy group having 1 to about 4 carbon atoms; a straight-chain or branched alkylmercapto group having 1 to about 7 carbon atoms; a substituted alkylmercapto group of the formula:




II

wherein x is the integer 1 or 2, $R_1$ can represent hydrogen and methyl, and $R_2$ can represent hydroxyl and an amino group of the formula:

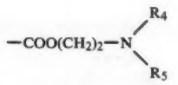



V

wherein $R_6$ can represent hydrogen, and methyl, $R_7$ can represent methyl, substituted benzyl, and $R_6$ and $R_7$ together with the nitrogen can constitute a substituted pyrrolidine ring; a sulphonyl group of the formula:

III

wherein $R_3$ can represent amino, alkyl of 1 to 3 carbon atoms; and an aminoethoxycarbonyl group of the formula:




IV

wherein $R_4$ and $R_5$ which can be the same or different can represent hydrogen, methyl and ethyl; and the pharmaceutically acceptable salts of said compounds.

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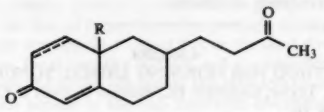
**4,303,674**

## SUBSTITUTED DECALINS, THEIR PREPARATION AND USE

**Alexander C. Goudie, Harlow, England, assignor to Beecham Group Limited, England**

**Filed May 27, 1980, Ser. No. 153,077**
**Claims priority, application United Kingdom, Jun. 8, 1979, 20052/79; Oct. 29, 1979, 37457/79**
**Int. Cl.³ A61K** *31/12*; **C07C** *49/637*
**U.S. Cl. 424—331** **5 Claims**

1. A compound of formula:



wherein the dotted line is a carbon-carbon single or double bond and R is hydrogen or methyl.

3. A pharmaceutical composition having anti-inflammatory activity adapted for topical administration which comprises an anti-inflammatory effective amount of a compound according to claim 1 and a pharmaceutically acceptable carrier.

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**4,303,675**

## MOSQUITO REPELLENT

**Joseph Di Pietro, and Giovanni Celia, both of San Donato Milanese, Italy, assignors to Anic, S.p.A., Palermo, Italy**

**Continuation of Ser. No. 941,375, Sep. 12, 1978, abandoned. This application Feb. 8, 1980, Ser. No. 119,976**

**Claims priority, application Italy, Sep. 21, 1977, 27751 A/77**

**Int. Cl.**[3] **A01N** *31/00*

**U.S. Cl. 424—343** **3 Claims**

1. A method of repelling mosquitoes comprising administering a mosquito repelling effective amount of a composition consisting essentially of 2,5-dimethyl-2,5-hexanediol and an inert carrier to a surface to be protected.

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**4,303,676**

## HYALURONATE BASED COMPOSITIONS AND COSMETIC FORMULATIONS CONTAINING SAME

**Endre A. Balazs, 3333M Henry Hudson Pkwy., Riverdale, N.Y. 10463**

**Filed Mar. 21, 1980, Ser. No. 133,481**

**Int. Cl.**[3] **A61K** *47/00;* **A01N** *25/00*

**U.S. Cl. 424—359** **10 Claims**

1. A water based, viscoelastic composition comprising, by weight, (a) a mixture of different sodium hyaluronate fractions, a first such fraction having a molecular weight of about 10,000 to 200,000 and a second fraction having a molecular weight of about $1\times10^6$ to $4.5\times10^6$, the ratio of said fractions being in the range of about 0.3–2:1, (b) about 50 to 400% of protein based on the weight of ingredient (a), said protein being derived from the natural material from which the hyaluronate is obtained, and (c) the balance being water.

5. A cosmetic formulation comprising, by weight, about 0.05–5.0% of the composition as claimed in claim 1, about 1–5% of an emollient, about 1–5% of a sugar alcohol, about 0.2–1% of a neutral or anionic polysaccharide, about 0.05–2% of a preservative, bacteriostatic and fungistatic substance which does not react with or degrade hyaluronic acid, the balance to make up 100% being distilled water.

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**4,303,677**

## FROZEN PIZZA PROCESS

**James De Acetis, Skokie, Ill., assignor to The Quaker Oats Company, Chicago, Ill.**

**Filed Sep. 18, 1979, Ser. No. 76,629**

**Int. Cl.**[3] **A21D** *8/02*

**U.S. Cl. 426—27** **4 Claims**

1. A method of making prepared specialty frozen food products which include filling-receiving crust portions made from a bread dough and filling portions received within said crusts, said method comprising preparing a bread dough product, subdividing said bread dough into individual dough elements, permitting said dough elements to rise, placing each of said dough elements with an associated forming pan having a flat, lower surface portion and an upwardly and outwardly tapering sideall surface, pressing said dough element within said pans so as to form said dough elements into flat sheets substantially co-extensive with said lower pan surface portions, permitting said dough sheets to rise, re-pressing said dough sheets so as to further extrude said dough radially and to cause said dough sheets to assume the contours of said pan bottom and sidewall surfaces, causing said crusts to assume substantially uniform thickness in said bottom and sidewall areas of said pans, at least partially baking said crusts, removing said crusts from said pan and placing said crusts in a container other than said forming pans, filling said baked crusts with a filling material, and freezing said completed products.

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**4,303,678**

## METHOD OF MANUFACTURING A PACKAGED SOYBEAN CURD

**Katsuhiro Ogasa, Yokohama; Morio Kuboyama, Tokyo; Kunisuke Kuwahara, Yokohama; Ryo Kato, Yokosuka, and Hiroshi Shimada, Tokyo, all of Japan, assignors to Morinaga Milk Industry Co., Ltd., Tokyo, Japan**

**Filed Aug. 1, 1980, Ser. No. 174,439**

**Claims priority, application Japan, Aug. 8, 1979, 54-100883**

**Int. Cl.**[3] **A23L** *1/20;* **A23J** *3/00*

**U.S. Cl. 426—46** **5 Claims**

1. A method of manufacturing a packaged soybean curd with long shelf life of at least 1 month at room temperature and withoug inclusion of any artificial coagulating agent, which comprises:

(a) inoculating a starter of lactic acid bacteria into pasteurized or sterilized soybean juice and homogeneously mixing the bacteria and juice;

(b) adding the mixture to a container;

(c) sealing the container;

(d) subjecting the mixture to fermentation in the container at the optimum temperature of the lactic acid bacteria until the pH of the mixture reaches to a value equal to or less than the value calculated by the following formula:

$$Y=5.2X^{0.071}$$

wherein Y represents pH of soybean juice at the the termination of fermentation, X represents the percentage of solids content of soybean juice within the range of 5% to 16% by weight

and

(e) heating the fermented soybean juice in the container at 60°–95° C. for 10–100 minutes to adjust the resulted curd tension of soybean curd to more than 20 grams.

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**4,303,679**

## METHOD AND BACTERIAL COMPOSITIONS FOR FERMENTING MEATS

**Moshe Raccach, Sarasota, Fla., assignor to Microlife Technics, Inc., Sarasota, Fla.**

**Filed Jan. 24, 1980, Ser. No. 114,760**

**Int. Cl.**[3] **A23B** *4/12;* **A23C** *11/00;* **C12P** *7/56;* **C12N** *1/20*

**U.S. Cl. 426—59** **19 Claims**

12. A culture of *Pediococcus pentosaceus* adapted for meat fermentations including an assimilable carbohydrate at smokehouse temperatures between about 15.6° C. and 48.9° C. which comprises a selected *Pediococcus pentosaceus* grown in growth medium including assimilable sources of carbon, nitrogen and inorganic substances to a concentration of at least about $1\times10^7$ of the *Pediococcus pentosaceus* per ml, having a pH between about 4 and 7 and said culture containing a stimulatory food grade metal salt after growth in an amount sufficient to accelerate the fermentation in the meat by providing a concentration of metal ion between about 0.01 ppm and 1500 ppm in the meat, wherein the selected *Pediococcus pentosaceus* culture has the meat fermentation characteristics of *Pediococcus pentosaceus* NRRL-B-11,465 and is characterized by an ability to rapidly ferment in a meat admixture with an assimilable sugar at temperatures in a range between 15.6° C. and 26.7° C. to produce a pH less than about 5.

4,303,680

## PRODUCTION OF YEAST EXTRACT CONTAINING FLAVORING

Tetsuo Tanekawa; Hiroshi Takashima, both of Kawasaki, and Tomoyoshi Hachiya, Kunitachi, all of Japan, assignors to Ajinomoto Company, Incorporated, Tokyo, Japan

Filed Jan. 2, 1980, Ser. No. 109,083
Claims priority, application Japan, Jan. 5, 1979, 54-798
Int. Cl.[3] A23L *1/28, 2/26;* C12N *1/06, 1/08*
U.S. Cl. 426—60 5 Claims

1. A method for producing a yeast extract containing flavoring 5'-nucleotide and having an improved thickness or body in taste which comprises:

(1) autolysing suspended yeast cells in the absence of added enzymes and added sodium chloride, and in the presence of an organic material that stimulates autolysis at a constant pH ranging from 6.0 to 6.6, then

(2) heating the autolysed suspension at a temperature of 90° to 100° C. for 1 to 3 hours in the absence of added sodium chloride thereby extracting intracellular ribonucleic acid; and thereafter performing the following steps in any order;

(3) hydrolysing the extracted ribonucleic acid with a 5'-phosphodiesterase to form nucleotides including adenosine monophosphate and;

(4) separating the resulting extract from the insoluble residue.

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4,303,681

## MEAT FILLED PIE CONTAINING CHEMICALLY SET GEL PARTICLES AND PROCESS

Ian A. Challen; Sandra East, both of Rushden, and George R. Sanderson, Bedford, all of England, assignors to Internationale Octrooi Maatschappij "OCTROPA", Rotterdam, Netherlands

Filed Sep. 20, 1979, Ser. No. 77,732
Claims priority, application United Kingdom, Sep. 20, 1978, 37495/78
Int. Cl.[3] A21D *13/08;* A23L *1/04*
U.S. Cl. 426—92 8 Claims

1. A method of manufacturing a baked filled pie containing a meat filling in which a pastry shell is provided with a meat filling and baked, which comprises providing a pastry shell and introducing a filling comprising a mixture of comminuted, raw or partially cooked meat and chemically set gel particles, covering the filling with pastry and thereafter effecting heating to bake the pastry.

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4,303,682

## PROCESS OF MAKING MEAT LIKE FOOD PRODUCT

Jean L. Guitteny; Jean P. Plaze, both of Jargeau; Michel Roux, Saint Denis de l'Hotel, all of France, and Gregory N. Warren, Wodonga, Australia, assignors to Mars Incorporated, McLean, Va.

Continuation of Ser. No. 811,862, Jun. 30, 1977, abandoned. This application Sep. 26, 1979, Ser. No. 79,166
Claims priority, application France, Jun. 30, 1976, 76 19900
Int. Cl.[3] A23J *3/00;* A23L *1/275*
U.S. Cl. 426—250 14 Claims

1. A process for the preparation of a food product of moisture content between 15% and 50% by weight simulating marbled meat and including portions immitating the appearances of lean meat and fat, which method comprises: separately preparing at least two plastic proteinaceous food compositions respectively immitating in color the appearances of lean meat and fat, at least one of said compositions as prepared having a consistency of at least 300 Brabender units and the lean and fat simulating compositions exhibiting a difference in consistency at the same temperature of from 20–700 Brabender units; and blending together the compositions at substantially equal temperatures to intermingle said compositions at least sufficiency to form a marbled product in which the two portions are randomly distributed.

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4,303,683

## METHOD FOR SKINNING ANIMAL TONGUE

Robert E. Taylor, Glenview, Ill., assignor to Swift & Company, Chicago, Ill.

Filed Jun. 13, 1980, Ser. No. 159,361
Int. Cl.[3] A23L *1/31*
U.S. Cl. 426—264 14 Claims

1. A method of skinning whole animal tongues, comprising:

trimming the bone and excess fat from an unfrozen whole animal tongue,

soaking the trimmed tongue in an unheated edible acid solution having a pH of 2.75±0.2 for 30 minutes,

pre-cooking the soaked tongue in a hot edible acid solution maintained at 200° to 205° F. for 45 to 50 minutes and having a pH of 2.75±0.2, and skinning the pre-cooked tongue.

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4,303,684

## RAPIDLY-SOLUBLE SWEETENER, PROCESS FOR ITS PREPARATION AND BEVERAGE MIX EMPLOYING IT

Esra Pitchon, Flushing, N.Y., and Marvin Schulman, Howell, N.J., assignors to General Foods Corporation, White Plains, N.Y.

Filed Mar. 17, 1980, Ser. No. 130,941
Int. Cl.[3] A23L *1/09, 2/40*
U.S. Cl. 426—312 28 Claims

1. A dry, rapidly soluble sweetener composition sprayed under superatmospheric pressure and dried, having a density of less than 0.40 grams per cubic centimeter and comprising a codried intimate mixture of from 15 to 65% fructose, from 15 to 30% dextrinized starch having a dextrose equivalent of less than 15, and from 30 to 65% sucrose, all percentages being based on the dry weight of the total composition.

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4,303,685

## METHOD OF PRODUCING MINCED FISH MEAT

Noboru Katoh; Kazumiya Komatsu, and Hisashi Nozaki, all of Sayama, Japan, assignors to Kibun Company Limited, Tokyo, Japan

Continuation of Ser. No. 52,941, Jun. 28, 1979, abandoned. This application Feb. 5, 1981, Ser. No. 231,943
Claims priority, application Japan, Dec. 12, 1978, 53-152705
Int. Cl.[3] A22C *25/14, 25/16*
U.S. Cl. 426—332 3 Claims

1. A method of treating fish comprising separating the meat from the whole fish whose heads and organs have been removed, blocks of such fish or fillets of such fish, while submerged in water or in an aqueous solution containing 0.1–20% of at least one member selected from the group consisting of sorbitol, dextrin, sucrose, sodium glutamate, glycine, sodium bicarbonate, sodium carbonate, disodium phosphate and polymerized sodium phosphate, whereby rapid deterioration caused by breakdown of meat cells during meat separation is substantially avoided.

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4,303,686

## PROCESS FOR REDUCING ACID CONTENT STEAMED COFFEE

Robert P. Stolz, Dumont, N.J.; Norman P. Ouellette, Goshen; Johanna M. Linthorst, Yonkers, both of N.Y., and Thomas V. Herlihy, Rutherford, N.J., assignors to General Foods Corporation, White Plains, N.Y.

Filed Feb. 12, 1980, Ser. No. 120,802
Int. Cl.[3] A23F *5/16*
U.S. Cl. 426—386 4 Claims

1. A process for reducing the acid content of soluble coffee solids obtained from an elongated bed of roasted coffee which has been subjected to a flow of atmospheric or superatmos-

pheric steam for a period of time in excess of ten minutes in order to remove volatile aromas which process comprises stopping the flow of steam, thereafter passing a stream of of air or nitrogen through the steamed bed, in the same direction as steam flow, for at least five minutes, and at a superficial velocity in excess of 3 meters per minute and sufficient to entrain the liquid acids present in the bed, thereafter discarding the entrained liquid acids and extracting the steamed and swept coffee to form an aqueous extract and drying the resulting extract.

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4,303,687

## TREATMENT OF BAKERY PRODUCTS TO BE STORED IN THE DEEP FROZEN STATE

**Werner Ratjen, Freeweid 12-14, 2302 Flintbek, Fed. Rep. of Germany**

**Filed Dec. 20, 1979, Ser. No. 105,596**

**Claims priority, application Fed. Rep. of Germany, Dec. 27, 1978, 2856272**

**Int. Cl.³ A21D** *13/00, 15/00;* **A23L** *3/36*

**U.S. Cl. 426—497** **4 Claims**

1. In a method for the treatment of baking products to be stored in the deep-frozen state, of the type which have a crust covering the inner crumb, which crust separates from the crumb during deep-frozen storage, and in which, after the baking process, the products are deep-frozen in a freezer plant, and are later removed from the plant and thawed for consumption purposes, the improvement comprising injecting a material, selected from the group consisting of water, water vapor and steam, into the products prior to the deep-freezing step in order to prevent a separation of crust and crumb during the storage of the products, the material being injected through the crust into the crumb, at a weight of approximately 4 grams per 100 grams of completely baked bakery products.

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4,303,688

## METHOD OF PRODUCING FIBROUS FISH PASTE

**Naohiko Shimura, Konosu; Takeo Shinada, Kawagoe; Mituga Ikoma, Sayama, and Hisao Nakashima, Kawagoe, all of Japan, assignors to Kibun Company Limited, Tokyo, Japan**

**Filed Dec. 5, 1979, Ser. No. 100,436**

**Int. Cl.³ A22C** *25/20;* **A23L** *1/325*

**U.S. Cl. 426—513** **2 Claims**

1. A method of producing fish paste, consisting essentially of:

adding water to fish meat consisting essentially of minced fish meat, in an amount of from 40% to 70% of the minced fish meat;

mixing the minced fish meat and water to form a minced fish product;

molding the minced fish product into a predetermined shape;

setting the molded product;

finely dividing the set product into a plurality of fibers or flat pieces extending in parallel; and then

heating the resulting plurality of parallel finely divided fibers or flat pieces without separating each fiber or flat piece individually,

thereby obtaining a fish paste whose inner part has been finely divided into the form of fibers or flat pieces consisting essentially of minced fish meat and water, all of said fibers of flat pieces being in parallel and at the same time joined to each other to such a degree that each fiber or flat piece separates individually with ease in the mouth upon eating, and wherein the outer surface of said fish paste is in the form of a pellicle united to the inner part of said fish paste as one body.

4,303,689

## FLAVORING WITH PYRAZINE DERIVATIVES

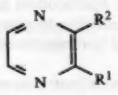
**Max Winter, Petit-Lancy; Fritz Gautschi, Commugny; Ivon Flament; Max Stoll, both of Petit-Lancy, all of Switzerland, and Irving M. Goldman, Niantic, Conn., assignors to Firmenich SA, Geneva, Switzerland and General Foods Corporation, White Plains, N.Y.**

**Division of Ser. No. 70,560, Sep. 8, 1970, Pat. No. 3,702,253, which is a continuation of Ser. No. 543,069, Apr. 18, 1966, abandoned, which is a continuation-in-part of Ser. No. 452,342, Apr. 30, 1965, abandoned. This application Apr. 13, 1972, Ser. No. 243,850**

**Int. Cl.³ A23L** *1/234*

**U.S. Cl. 426—537** **3 Claims**

1. A foodstuff having added thereto a small but flavor-modifying amount of a compound consisting essentially of a pyrazine derivative having the following formula:



wherein

(a) $R^1$ is a methyl group and $R^2$ is either an alkyl group having from 2 to 6 carbon atoms which can be branched at the chain end when said chain has 3 or 4 carbon atoms, or a vinyl, a thienyl-2 or a pyrryl-1 group; or

(b) $R^1$ is an ethyl group and $R^2$ is an ethyl or a vinyl group.

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4,303,690

## PROCESS FOR MANUFACTURING THIN-WALLED, HOLLOW PASTRY ARTICLES

**Franz Haas, Sr., Gerstlgasse 25; Franz Haas, Jr., Deublergasse 29, both of Vienna, Austria (1210), and Johann Haas, 209 Wiener Strasse, Spillern, Austria (2104)**

**Continuation of Ser. No. 835,683, Sep. 22, 1977, abandoned. This application Jun. 12, 1979, Ser. No. 47,822**

**Claims priority, application Austria, Sep. 30, 1976, 7258/76**

**Int. Cl.³ A21D** *2/10, 8/08, 10/00*

**U.S. Cl. 426—549** **8 Claims**

1. A process for manufacturing hollow, thin-walled pastry articles, comprising the steps of:

preparing a mixture of flour and sugar with at least about 400 grams of sugar per kilogram of flour;

adding to the mixture an amount of water only sufficient to make a kneadable, firm, shape-holding waffle dough;

forming a discrete dough body in a definite shape from the prepared waffle dough;

placing the shaped body of waffle dough on one part of an open baking mold having a hollow part at least partially closed at one end and a core part received in the hollow part;

bringing the parts of the baking mold together to close the mold around the dough to define the shape of the article;

baking the dough with the mold closed;

allowing vapor to escape from the mold at least intermittently while continuing to bake the dough until the article is formed and then;

opening the mold and removing the article.

4,303,691

## PROTEINACEOUS FOOD PRODUCT

Ralph E. Sand, and Richard E. Johnson, both of Plano, Tex., assignors to Anderson, Clayton & Co., Houston, Tex.

Continuation of Ser. No. 949,928, Oct. 10, 1978, abandoned, which is a continuation-in-part of Ser. No. 916,028, Jun. 15, 1978, abandoned. This application Oct. 10, 1980, Ser. No. 196,010

Claims priority, application United Kingdom, Nov. 9, 1977, 46699/77

Int. Cl.[3] A23C *20/00*

U.S. Cl. 426—573 12 Claims

1. A proteinaceous food product simulating cheese, comprising a blend of the following by weight percent on a pre-cooked basis:

(a) soy protein comprising in combination soy isolate and cold insoluble soy fraction,

(b) up to about 5% gelatin,

(c) about 0.1 to 2.5% hydrocolloid gum,

(d) fat in an amount effective to give desired characteristics of melt, mouth-feel and mushiness of the food product, and

(e) water in an amount effective to solubilize the said blend and to aid in melting of the final food product, said food product having a pH of about 5.0 to 5.8.

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4,303,692

## INFANT MILK FORMULA

Gerald E. Gaull, 1107 Fifth Ave., New York, N.Y. 10028

Continuation of Ser. No. 963,026, Nov. 22, 1978, abandoned, which is a continuation of Ser. No. 738,080, Nov. 22, 1976, abandoned. This application Nov. 2, 1979, Ser. No. 90,639

Int. Cl.[3] A23C *11/00, 21/00;* A23J *1/14, 1/20*

U.S. Cl. 426—580 15 Claims

1. A synthetic infant milk formula containing as an additive thereto taurine at a concentration in the range from about 15 to about 60 μmoles percent, said formula being essentially free of taurine prior to addition of taurine thereto.

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4,303,693

## METHOD OF APPLYING A CERAMIC COATING TO A METAL WORKPIECE

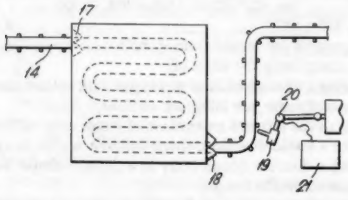
Ronald W. Driver, Clitheroe, England, assignor to Rolls-Royce Limited, London, England

Filed Sep. 15, 1980, Ser. No. 187,405

Claims priority, application United Kingdom, Sep. 22, 1979, 32941/79

Int. Cl.[3] B05B *7/22*

U.S. Cl. 427—34 8 Claims




1. A method of applying a ceramic coating to a metallic workpiece comprising the steps of:

heating the metallic workpiece to a temperature in a range of 500° C. to 950° C. with at most a thin and strongly adherent coat of metallic oxide forming on the workpiece;

and then before a further oxide coating forms on the heated workpiece, immediately plasma spraying the ceramic coating on to the heated workpiece in an atmosphere of air.

4,303,694

## METHOD AND DEVICE OF DEPOSITION THROUGH VACUUM EVAPORATION MAKING USE OF A MODULATED ELECTRON BEAM AND A SCREEN

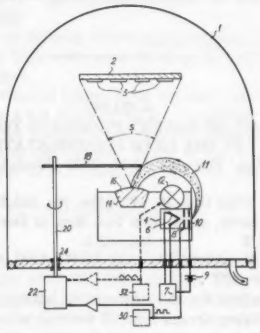
Daniel Bois, 9, rue de la Grange, 38240 Meylan, France

Filed May 1, 1980, Ser. No. 145,727

Claims priority, application France, May 4, 1979, 79 11311

Int. Cl.[3] C23C *13/12*

U.S. Cl. 427—42 4 Claims



1. A method of depositing through vacuum evaporation, said method comprising the steps of, first, in order to deposit a material on substrates, placing said substrates in a vacuum enclosure opposite a target of the said material; bombarding said target by means of an electron-beam; modulating said beam on an "on-off basis"; moving a screen, opaque to X-rays, between said target and said substrate in synchronism with said modulation; said screen being interposed between said target and said substrates during those time-intervals when there is a beam, said screen being retracted during those time-intervals when there is no beam.

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4,303,695

## CRINKLE EMBOSS AND METHOD

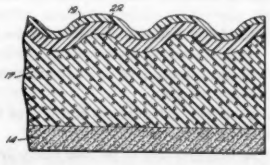
Thomas J. McCann, Hollywood, and Ernest E. Regan, Fort Lauderdale, both of Fla., assignors to Biscayne Decorative Products, Inc., Miami, Fla.

Continuation of Ser. No. 862,641, Dec. 20, 1977, abandoned. This application Aug. 7, 1979, Ser. No. 64,436

The portion of the term of this patent subsequent to Jul. 11, 1995, has been disclaimed.

Int. Cl.[3] B32B *3/00;* B05D *3/06*

U.S. Cl. 427—44 19 Claims




1. A method for creating a crinkle finish surface on a flexible foamed decorated substrate in an uninterrupted process comprising the steps of,

coating a vinyl overlay over a decorated foamable substrate,

exposing the coated flexible decorated substrate to an elevated temperature whereupon the foamable coat has expanded to a cellular foam and the vinyl overlay is fused,

cooling the thus foamed and fused vinyl substrate to a tem-

perature compatible with the application of an actinic radiation curable coating,

passing the thus foamed and fused vinyl substrate through a coating station where an essentially solvent free acryl-ourethane oligomer actinic radiation curable coating of lower elongation properties than that of the vinyl overlay is applied at temperatures less than 180° F.,

thereafter curing said coating upon exposure to actinic radiation at elevated temperatures between 180° and 250° F. for less than one minute,

whereupon exposure to said radiation at said elevated temperature results in a product exhibiting a crinkle surface texture which has been created on the surface of the flexible substrate by permitting the differential elongation properties of the vinyl overlay and the actinic radiation cured coating to interact to give the crinkle surface texture.

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## 4,303,696
## RADIATION CURING OF PREPOLYMER COATING COMPOSITIONS

**Karl Brack, Holliston, Mass., assignor to Design Cote Corp., Westminster, Mass.**

**Division of Ser. No. 835,477, Sep. 21, 1977, Pat. No. 4,218,294, which is a division of Ser. No. 575,252, May 7, 1975, Pat. No. 3,989,609. This application Aug. 11, 1980, Ser. No. 177,001**

**Int. Cl.³ B05D** *3/06*

**U.S. Cl. 427—44** **13 Claims**

1. A method of producing a durable coating on the surface of a solid comprising the steps of:

modifying a polyamide containing primary and/or secondary amine groups, (internally and/or terminally) with unsaturated esters, anhydrides, and/or acids in ratios from 2:1 to 10:1 (unsaturated ester, acid or anhydride: polyamide) thereby obtaining an unsaturated prepolymer which will copolymerize with acrylic and/or methacrylic monomers,

mixing with said prepolymer, as so modified, a quantity of acrylic and/or methacrylic monomer ester material, vinyl acetate, and/or vinyl pyrolidone, in proportion between about 1:1 and 1:20 (modified prepolymer to monomer ester);

coating said mixture on the surface of a sheet, plate or other solid body, and

irradiating said coating, as sensitized, with actinic radiation or, as unsensitized, with an electron beam, to produce a cured film.

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## 4,303,697
## PROCESS FOR IMPROVING THE ADHESION OF PAINT TO POLYOLEFIN SURFACES

**Gerald A. Baseden, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 39,946, May 17, 1979, abandoned. This application Aug. 18, 1980, Ser. No. 178,733**

**Int. Cl.³ B05D** *3/06*

**U.S. Cl. 427—54.1** **9 Claims**

1. A process for preparing for painting the surface of an article made of a polyolefin selected from:

(1) polyethylene, polypropylene, and crystalline dipolymers of ethylene and propylene;

(2) blends of at least two members of the group recited in (1) above; and

(3) blends of at least one member of the group recited in (1) above with at least one elastomer selected from the class of ethylene/propylene dipolymers and EPDM copolymers in which the total amount of elastomeric polymers is at most about 50 weight percent of the final polymer blend;

said process comprising the steps of:

(a) cleaning said surface;

(b) priming the cleaned surface with a thin layer of a chlorinated polymeric material selected from:

(1) a chlorinated polypropylene containing about 5–25 weight percent of chlorine and having a number average molecular weight of about 5,000–50,000, and

(2) a chlorinated polypropylene containing carboxylic anhydride groups and about 5–25 weight percent of chlorine and having a number average molecular weight of about 5,000–50,000; and

(c) exposing the primed surface to ultraviolet radiation.

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## 4,303,698
## USE OF PROLONGED TACK TONERS FOR THE PREPARATION OF ELECTRIC CIRCUITS

**Grant A. Beske, Princeton Junction; Abraham B. Cohen, Springfield, both of N.J., and Roger O. Uhler, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Feb. 25, 1980, Ser. No. 124,607**

**Int. Cl.³ H05K** *3/10, 3/12*

**U.S. Cl. 427—96** **16 Claims**

1. Process for the preparation of an electrically conductive pattern on an inert substrate comprising

(a) applying a particulate prolonged tack toner comprising an organic polymer and solid plasticizer to an image of the pattern on the inert substrate, said image having toner-receptive and background areas,

(b) heating the toned image to a temperature sufficient to activate the toner by rendering the toner tacky,

(c) reducing the temperature of the heated image below the activating temperature of the prolonged tack toner wherein the activated prolonged tack toner remains tacky,

(d) applying prolonged tack toner comprising organic polymer, solid plasticizer, conductive particles and glass frit to the tackified toned image,

(e) optionally repeating steps (b) through (d) at least one time,

(f) burning off the organic polymer and plasticizer components of the prolonged tack toner by increasing the temperature of the inert substrate and toned image, and

(g) firing the inert substrate and toned image to a temperature sufficient to fuse the glass frit and sinter the conductive particles.

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## 4,303,699
## METHOD OF MANUFACTURING MAGNETIC POWDER

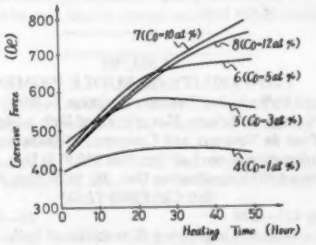
**Hideo Tamura, Tagajyo, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed May 6, 1980, Ser. No. 147,189**

**Claims priority, application Japan, May 10, 1979, 54-57374; Jun. 27, 1979, 54-80955**

**Int. Cl.³ B05D** *5/12*

**U.S. Cl. 427—132** **10 Claims**




1. Method of manufacturing magnetic powder, consisting of:

(a) forming a mixture consisting essentially of acicular magnetic iron oxide powder and metallic cobalt in an aqueous

solution of an alkali hydroxide having a concentration of 0.1 mol/l to 10 mol/l under agitation, and

(b) keeping said solution at an elevated temperature during said agitation to cause deposition of cobalt and/or cobalt compound on surface of said iron oxide powder.

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**4,303,700**

## SPRAYABLE MATERIAL FOR REPAIRING BASE PLATES OF INGOT MOLDS

**Paul G. Adams, Birmingham, Ala., and Kenneth A. Gebler, Munster, Ind., assignors to Nalco Chemical Company, Oak Brook, Ill.**

**Continuation of Ser. No. 64,169, Aug. 6, 1979, abandoned, which is a continuation-in-part of Ser. No. 966,679, Dec. 5, 1978, Pat. No. 4,188,416. This application Sep. 2, 1980, Ser. No. 183,557**

**The portion of the term of this patent subsequent to Feb. 12, 1997, has been disclaimed.**

**Int. Cl.³ B26D** *7/38*

**U.S. Cl. 427—135** **2 Claims**

1. A process for repairing ingot mold stools which comprises:

(1) forming a thixotropic, self-leveling stool repair material comprising:

(a) 50–80% by weight powdered aluminum silicate, said silicate having the following particle size distribution:
10–25% not greater than 200 mesh
75–90% 15–30 mesh

(b) 4–17% by weight powdered alumina of from 200–400 mesh

(c) 0.2–5.0% bentonite clay of from 200–400 mesh

(d) 4.0–25% of a binder having a composition comprising:
75% phosphoric acid—72–82%
alumina trihydrate—6.2–16.2%
powdered boric acid—1.0–7.0%; and
water—4.0–14.0%

(e) 5.0–30% water

(2) pumping said stool repair material onto an ingot mold stool, said stool having been previously damaged by molten metal;

(3) allowing said composition to cure, utilizing the residual heat contained in said ingot mold stool; and then,

(4) recovering a repaired ingot mold stool having a strong, crack-free patch.

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**4,303,701**

## METHOD OF MARKING PLASTIC LENSES

**Daniel L. Torgersen, Sauk Rapids, and Leon H. Fischer, Cold Spring, both of Minn., assignors to Buckbee-Mears Company, St. Paul, Minn.**

**Filed Dec. 31, 1979, Ser. No. 108,341**

**Int. Cl.³ G02B** *1/10;* **C09K** *11/00*

**U.S. Cl. 427—145** **6 Claims**

1. The method of marking a polymer plastic lens having a polymer network comprising applying a fluorescent material to the surface of a plastic lens, allowing sufficient time to permit migration of the fluorescent material into the polymer network and then removing the excess fluorescent material on the surface of the lens.

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**4,303,702**

## FLOWABILITY OF RUTILE PIGMENT

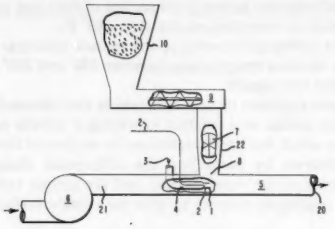
**Raymond Bullock, Jr., Newark; Christian E. Rick, Wilmington, and George A. Schurr, Newark, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 972,971, Dec. 26, 1978, abandoned. This application Dec. 26, 1979, Ser. No. 106,403**

**Int. Cl.³ C04B** *31/02*

**U.S. Cl. 427—220** **2 Claims**

1. A method of improving flowability of bulk, fine particle size, rutile titanium dioxide pigment that facilitates unloading or transferring said pigment comprising injecting at a high velocity a gas stream into a chamber while atomizing naphthenic acid into the high velocity gas stream, thereby providing a zone of turbulence, adding particulate titanium dioxide having a mean particle size less than 1 micron into the zone of turbulence, supplying a low velocity gas stream at the inlet to the chamber parallel to the high velocity gas and conveying




the gas, naphthenic acid and titanium dioxide through the chamber, the ratio of high velocity gas to low velocity gas being more than 3:1 and the amount of naphthenic acid is 0.05–2% by weight based on the weight of titanium dioxide.

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**4,303,703**

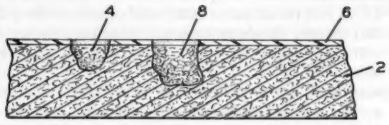
## METHOD OF MAKING AN IMPROVED NATURAL-TEXTURED CEILING TILE

**Donald E. Maron, Lancaster, Pa., assignor to Armstrong World Industries, Lancaster, Pa.**

**Filed Jul. 21, 1980, Ser. No. 170,649**

**Int. Cl.³ B05D** *3/12*

**U.S. Cl. 427—272** **2 Claims**




1. A method of treating a fibrous panel having at least one planar surface containing therein fissures, the method comprising the steps of:

(a) roll coating said at least one planar surface of the fibrous panel with a hardenable liquid abrasive resist which will extend at least partly into the surface of said panel in contacting relationship with the fibers of said panel, said resist only coating all of said above planar surface of the panel and not being applied into the fissures of the panel;

(b) drying the liquid abrasive resist to harden it; and

(c) abrasively treating said above planar surface to erode the fissures to enlarge them while maintaining said above planar surface treated with said resist unaffected by the erosion treatment step.

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**4,303,704**

## SELECTIVE REMOVAL OF COPPER OR NICKEL FROM COMPLEXING AGENTS IN AQUEOUS SOLUTION

**Constantine I. Courduvelis, 937 Garden Rd., Orange, Conn. 06477, and George C. Gallager, 260 Pearl St., Middletown, Conn. 06457**

**Filed May 19, 1980, Ser. No. 150,924**

**Int. Cl.³ B01J** *45/00*

**U.S. Cl. 427—345** **46 Claims**

14. A continuous process for maintaining a predetermined maximum concentration of complexed heavy metal ions in an aqueous rinse solution bath containing complexed heavy metal ions and complexing agent selected from the group consisting of alkanolamines or carboxylic acids or salts thereof by selec-

tive removal of said heavy metal ions, with said complexing agent remaining in solution, comprising the steps of:

(a) providing a bed of chelating ion-exchange resin having an iminodiacetic acid functionality,

(b) passing a portion of said aqueous solution from said bath containing complexed heavy metal ions and complexing agent through said resin bed at a rate substantially no less than the rate at which complexed heavy metal ions enter said bath, said resin bed containing sufficient resin to selectively remove and retain substantially all of said heavy metal ions from said aqueous solution passed therethrough, with substantially all of said complexing agent remaining in the effluent passing out of said resin bed,

(c) recycling said effluent from said resin bed to said bath, and

(d) eluting said retained heavy metal ions from said resin bed by passage therethrough of an aqueous acid solution, whereby the eluate contains heavy metal ions and is substantially free of said complexing agent, and whereby said resin bed is regenerated for reuse.

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**4,303,705**

## TREATMENT OF WOOD WITH WATER-BORNE PRESERVATIVES

**William C. Kelso, Jr., 14 Bulldog Dr., Starkville, Miss. 39759**

**Filed Sep. 27, 1977, Ser. No. 836,986**

**Int. Cl.³ B05D** *1/18, 3/02, 3/12*

**U.S. Cl. 427—351** **12 Claims**

1. A process for treating wood with water-borne materials, comprising;

placing the wood in a pressure vessel;

introducing the water-borne materials into the vessel and submerging the wood;

raising the pressure within the vessel and impregnating the wood with the water-borne materials until a desired gross absorption is achieved;

heating the interior of the vessel to a temperature of at least 150° F.;

maintaining the temperature and pressure after the gross absorption has been achieved for at least an hour and until a major portion of the water-borne materials become affixed to or precipitated on the wood; and

relieving the pressure and collecting the kick-back.

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**4,303,706**

## PROCESS FOR THE PREPARATION OF SUEDE-LIKE RAISED FABRIC

**Norihiro Minemura, Takatsuki, and Takeo Kimura, Ibaraki, both of Japan, assignors to Teijin Limited, Osaka, Japan**

**Filed Jun. 12, 1980, Ser. No. 158,756**

**Claims priority, application Japan, Jun. 15, 1979, 54-74581**

**Int. Cl.³ B32B** *7/00;* **B05D** *3/02;* **D04H** *1/58;* **B32B** *27/00*

**U.S. Cl. 427—381** **3 Claims**

1. A process for the preparation of a suede-like raised fabric which comprises; preparing a raised fabric which has naps consisting of extra fine fibers whose monofilament fineness is in the range of 0.0001 to 0.8 denier; applying an emulsion of a melamine resin to said raised fabric; and, after drying, heat-treating the applied raised fabric at a temperature of 100° to 180° C. to let the melamine resin in the fabric harden.

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**4,303,707**

## BUILDING COMPONENT AND METHOD OF MAKING THE SAME

**John Prior, c/o Industrial Salvage, Centralia, Ill. 62801**

**Continuation-in-part of Ser. No. 826,323, Aug. 22, 1977, abandoned. This application Oct. 31, 1979, Ser. No. 90,014**

**Int. Cl.³ B32B** *1/04;* **B05D** *1/12*

**U.S. Cl. 427—397** **1 Claim**

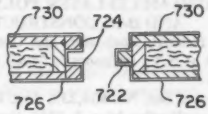
1. The method of making a building component comprising the steps of:

(a) forming a rectangular open box including a sidewall formed from wood structural members and a lower wall formed from plywood,

(b) placing core material within the form,

(c) placing an upper wall formed from plywood on the form open top to close the box,

(d) attaching an elongate strip on one side of said box to provide a tongue,




(e) attaching a pair of spaced elongated strips on an opposite side of said box to provide a groove to interfit a tongue such as that provided on said one side of said box, and

(f) applying a plastic binder reinforced with fiber strand particles over the entire box including the tongue and groove to provide a substantially rigid complete cover sealing the box.

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**4,303,708**

## HEAT-SEALABLE PLASTIC FILM, PROCESS FOR ITS MANUFACTURE, AND THE USE OF THE FILM

**Dieter Gebhardt, Wiesbaden; Günther Crass, Taunusstein, and Siegfried Janocha, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Mar. 30, 1979, Ser. No. 25,682**

**Claims priority, application Fed. Rep. of Germany, Apr. 3, 1978, 2814311**

**Int. Cl.³ B65D** *1/00;* **C09J** *7/02;* **B32B** *27/08*

**U.S. Cl. 428—35** **20 Claims**

1. Opaque film of thermoplastic organic material which has been oriented by biaxial stretching, comprising a base layer of a polymer or copolymer of an α-olefin having 2 to 6 carbon atoms containing an amount between about 1 and 25 percent by weight, calculated on the weight of the polymer, of finely distributed solid particles ranging in size from about 0.2 to 20 μm sufficient to render said film opaque, and carried on at least one surface of said base layer, a heat-sealable layer comprising a copolymer comprised predominatly of propylene, selected from a copolymer of propylene with ethylene, a copolymer of propylene with butene, or a terpolymer of propylene with ethylene and a further α-olefin having from 4 to 10 carbon atoms, whereby said film is opaque and has improved pearlescent lustre.

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**4,303,709**

## COEXTRUDED LAMINAR THERMOPLASTIC BAGS

**Robert H. Olson, Pittsford, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.**

**Continuation of Ser. No. 865,088, Dec. 27, 1977, abandoned. This application Dec. 14, 1979, Ser. No. 103,318**

**Int. Cl.³ B32B** *27/08*

**U.S. Cl. 428—35** **5 Claims**

1. A two-layer coextruded, thermoplastic laminar bag construction particularly suitable for the containment of food which has to be heated in aqueous media, said aqueous media being maintained at temperatures of up to about 212° F., consisting of a continuous outer layer of polypropylene film and a

continuous inner film layer of a high density ethylene-octene-1 copolymer, said copolymer comprising less than about 10% by weight of octene-1 and having a density of about 0.945 g/cc.

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**4,303,710**

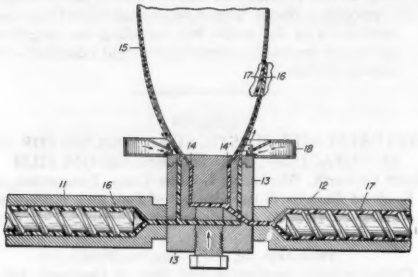
## COEXTRUDED MULTI-LAYER POLYETHYLENE FILM AND BAG CONSTRUCTION

**Edward M. Bullard, Rochester, and Gregory M. Smith, Palmyra, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation of Ser. No. 934,235, Aug. 16, 1978, abandoned. This application Mar. 3, 1980, Ser. No. 126,932**

**Int. Cl.³ B65D** *11/00;* **B32B** *7/02, 27/08*

**U.S. Cl. 428—35** **13 Claims**




6. A thermoplastic bag structure having film walls comprising an inner layer and an outer layer coextruded therewith, said inner layer consisting essentially of branched low density polyethylene homopolymer and said outer layer comprising a resinous blend of a high density polyethylene homopolymer and linear low density ethylene-alpha-olefin copolymer, wherein said blend contains a major amount of said copolymer, said layer of low density polyethylene having a thickness on the order of from about 65% up to about 85% of the overall thickness of said laminate.

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**4,303,711**

## TUBULAR FILM FOR PACKING AND CASING PASTE-TYPE FOODSTUFFS ESPECIALLY SAUSAGE AND CHEESE

**Gayyur Erk, Gorxheimertal, Turkey, and Rudi Korlatzki, Laudenbach, Fed. Rep. of Germany, assignors to Naturin-Werk Becker & Co., Weinheim, Fed. Rep. of Germany**

**Filed Nov. 14, 1979, Ser. No. 94,057**

**Claims priority, application Fed. Rep. of Germany, Nov. 17, 1978, 2850181; Nov. 17, 1978, 2850182**

**Int. Cl.³ F16L** *11/00;* **B65D** *85/00*

**U.S. Cl. 428—36** **32 Claims**

1. A tubular film consisting of biaxially stretched plastic material for packaging and casing paste-type foodstuffs that either, after packing, are heated or are packed in a hot fluid state, comprising a mixture of

(A) approximately 50–99 parts by weight of at least one aliphatic polyamide having a glass transition point in the dry state of at least 48° C. and a glass transition point after a moisture absorption of 3° C. or less and

(B) approximately 1–50 parts by weight of one or more members of the group consisting of an ionomer resin, a modified ethylene-vinylacetate copolymer and a modified polyolefin.

**4,303,712**

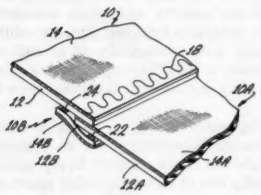
## FABRIC SILICONE ELASTOMER COMPOSITE

**E. Aubrey Woodroof, 16646 Mt. Cachuma Cir., Fountain Valley, Calif. 92708**

**Continuation-in-part of Ser. No. 5,319, Jan. 22, 1979, abandoned. This application Apr. 6, 1979, Ser. No. 27,679**

**Int. Cl.³ B32B** *3/00*

**U.S. Cl. 428—58** **14 Claims**




1. A fabric elastomer composite assembly comprising:

at least two sections of fabric elastic composite joined together by a watertight joint,

each section of said fabric elastomer composite being composed of a stretchable fabric material joined to a vulcanizable silicone elastomeric membrane layer,

said elastomeric membrane layer being sufficiently thin to permit passage of water vapor therethrough while preventing flow of water in liquid form therethrough, and

said watertight joint being formed at least in part by a bond between the elastomeric component of one of said sections being bonded to an elastomeric component of another section of elastomer fabric composite.

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**4,303,713**

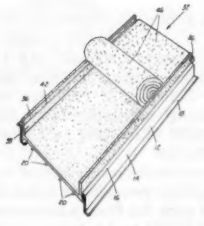
## ROOF INSULATION STRUCTURE AND METHOD OF MAKING SAME

**Carl L. Clemensen, P.O. Box 12090, Wichita, Kans. 67277, and Frank T. Mastalka, 4605 Holly St., Denver, Colo. 80216**

**Filed Jun. 18, 1979, Ser. No. 49,279**

**Int. Cl.³ B32B** *3/04*

**U.S. Cl. 428—121** **10 Claims**



1. A roll of insulating material used for receipt on top of a roof and when unrolled received between a pair of adjacent and parallel metal roof purlins, the purlins having a vertical web and upper and lower horizontal flanges integrally formed into the top and bottom of the web and former a "Zee", "C", truss or bar joist type configuration, the insulating material comprising:

a blanket of self-supporting medium density thermal insulation, the blanket having from end to end a substantially "U" shaped configuration, the blanket including;

a pair of side portions opposite each other and adapted for receipt on top of the upper horizontal flanges of the adjacent purlins;

a pair of intermediate portions adapted for receipt adjacent the web of the purlins, the intermediate portions divided

from the side portions by a pair of elongated slits cut in the top of the blanket and along the length thereof, the slits allowing the side portions of the blanket to be folded outwardly away from the slits and at an angle at least 90 degrees from the intermediate portions thereby allowing the side portions to be positioned on top of the upper horizontal flanges and the intermediate portions tucked adjacent the vertical web of the purlins; and

a center portion adapted for spanning the width between the adjacent purlins, the center portion divided from the intermediate portions by a pair of elongated notches cut in the top of the blanket and along the length thereof, the notches allowing the intermediate portions of the blanket to be folded inwardly toward the notches and at an angle up to 90 degrees from the center portion;

the blanket adapted for receiving a thick blanket of low density thermal insulation inside the substantially "U" shaped configuration.

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**4,303,714**

## PLASTICS MATERIAL MESH STRUCTURE

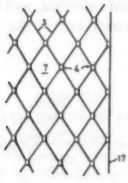
**Frank B. Mercer, Blackburn, England, assignor to P.L.G. Research Limited, Lancashire, England**

**Filed Oct. 9, 1979, Ser. No. 82,524**

**Claims priority, application United Kingdom, Oct. 16, 1978, 40640/78**

**Int. Cl.³ B32B *3/10*; B29C *17/02***

**U.S. Cl. 428—135** **14 Claims**



1. An integral plastic material diamond mesh structure, formed from a substantially uniplanar plastic starting material comprising mesh openings defined between orientated strands and junctions interconnecting the strands, substantially each junction having all its lateral zones orientated, so providing continuous lines of orientated plastic material running through the structure, each line comprising in succession a strand, the lateral zone of a junction, another strand, the lateral zone of the next junction, and so on, substantially each junction having a central zone of plastic material which is thicker than the lateral zones and is either unorientated or substantially less orientated than the lateral zones, the central zone being completely surrounded, as seen in plan, by the orientated plastic material of the lateral zones, all zones of said mesh structure being symmetrical about a median plane corresponding substantially to the median plane of the uniplanar starting material.

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**4,303,715**

## PRINTED WIRING BOARD

**Joseph J. Chang, Ewing Township Mercer County, N.J., assignor to Western Electric Company, Incorporated, New York, N.Y.**

**Continuation of Ser. No. 913,430, Jun. 7, 1978, abandoned, which is a division of Ser. No. 785,480, Apr. 7, 1977, Pat. No. 4,107,837. This application Dec. 3, 1979, Ser. No. 99,389**

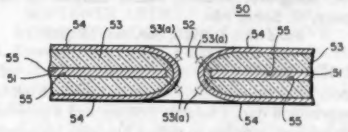
**Int. Cl.³ B05D *5/12*; B32B *3/24*; H05K *1/05***

**U.S. Cl. 428—137** **5 Claims**

1. A printed circuit board comprising:

(a) a metal substrate having a thickness of from about 1 to about 7 mils and a through hole; and

(b) a dielectric coat on said substrate fused from particles of a thermosetting material having a flow length value defined by the area extending between lines A and B in the graph of FIG. 2, said dielectric coat having a through hole



edge coverage of at least about 40 percent in thickness of the principle thickness of the dielecric coat.

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**4,303,716**

## DECORATIVE SURFACE ARTICLES

**John R. Eshbach; Richard E. Felter, and Thomas Posipanko, all of Lancaster, Pa., assignors to Armstrong World Industries, Lancaster, Pa.**

**Filed Nov. 14, 1980, Ser. No. 206,766**

**Int. Cl.³ B32B *27/12*, *3/26***

**U.S. Cl. 428—188** **13 Claims**

1. A process for producing an article suitable for use as a decorative surface covering, said process comprising:

(a) embedding, in a unidirectional orientation, a plurality of translucent solid fibers in a translucent binder;

(b) curing the binder; and

(c) subjecting the cured binder to pressure which is applied in such a manner to create aligned tubular air pockets adjacent to the surface of the fibers.

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**4,303,717**

## HEAT RELEASE LAYER FOR DECALCOMANIAS

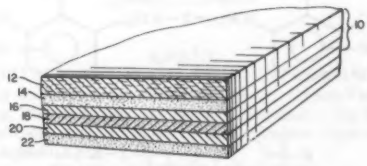
**Ray Andrews, Washington, Pa., assignor to Commercial Decal, Inc., Mount Vernon, N.Y.**

**Filed Aug. 23, 1979, Ser. No. 68,925**

**The portion of the term of this patent subsequent to Sep. 26, 1995, has been disclaimed.**

**Int. Cl.³ B32B *3/00***

**U.S. Cl. 428—200** **53 Claims**



1. A heat release decalcomania comprising a backing sheet, a heat release layer disposed on said backing sheet, a design layer disposed on said heat release layer and a heat activatable adhesive layer disposed on said design layer, said heat release layer comprising a normally solid straight chain, primary aliphatic oxyalkylated alcohol in combination with a normally solid polyethylene glycol having an average molecular weight of greater than about 1,000, said normally solid polyethyelene glycol being present in said heat release layer in an amount of from about 1 to about 50 percent.

4,303,718
PRINTING INK FORMULATIONS
James A. Snelgrove, Monson, Mass., assignor to Monsanto Company, St. Louis, Mo.
Filed Jun. 9, 1980, Ser. No. 157,998
Int. Cl.[3] B32B *3/10, 7/14, 27/30*
U.S. Cl. 428—201 4 Claims

1. A polyvinylbutyral interlayer printed with an ink formulation comprising a dye, a solvent medium and a polyvinyl formal in an amount sufficient to reduce blocking between polyvinyl butyral sheets printed using such a formulation.

2. A polyvinyl butyral interlayer printed with a printing ink formulation having a Shell #3 cup viscosity of from 15 to 50 seconds and comprising from 3 to 10 percent by weight of the ink base of a polyvinyl formal having a number average molecular weight of from 15,000 to 40,000 and an acetate content of from 8 to 35 percent by weight, measured as vinyl acetate, and a hydroxyl content of from 2 to 10 percent by weight measured as vinyl alcohol.

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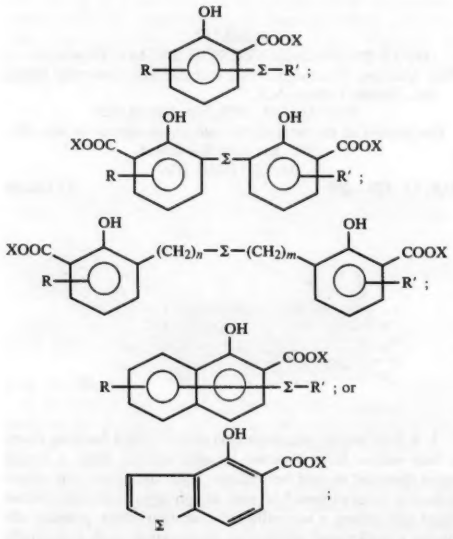
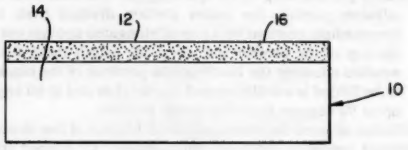
4,303,719
CHROMOGENIC COPY SYSTEM
Anthony E. Vassiliades, 8738 Tanager Woods Dr., Cincinnati, Ohio 45242
Filed Jul. 29, 1980, Ser. No. 173,254
Int. Cl.[3] B32B *5/16;* B41L *1/20*
U.S. Cl. 428—207 9 Claims

7. A coated front and back sheet for a pressure-sensitive chromogenic copy system comprising a substrate having on at least a portion of one surface thereof a coating of chromogen-containing microcapsules and on at least a portion of the other surface thereof a coating of a color developer capable of reacting with said chromogen to form color images, said color developer comprising a compound having the general formula:




wherein R and R' is each a hydrogen atom, a $C_1$–$C_{20}$ alkyl radical, or an aryl group, X is hydrogen or a metallic ion, Σ is a sulfur atom, or a sulfonyl or sulfone radical, n is 0 or an integer of 1 to 20, and m is an integer of 1 to 20.

4,303,720
DIELECTRIC PRODUCT
Philip J. Clough, Gorham, Me., assignor to Ludlow Corporation, Needham Heights, Mass.
Continuation-in-part of Ser. No. 913,250, Jun. 6, 1978, abandoned. This application Jul. 10, 1980, Ser. No. 167,361
Int. Cl.[3] B32B *5/16, 27/10, 27/32*
U.S. Cl. 428—211 21 Claims




1. A dielectric paper sheet of the type useful in dielectric printing processes, said paper sheet comprising a cellulosic paper substrate with an inorganic salt distributed therein in a quantity effective to form means to impart conductivity to said sheet when said sheet is equilibrated at 25° C. at relative humidities from 20 to 70%, the improvement wherein said substrate comprises a discontinuous dielectric printing coating on the surface thereon, said coating being formed of an organic polymer and filled with at least 40% inorganic fillers and having a minimum resistivity four orders of magnitude greater than the resistivity of said substrate, and wherein the said fillers are preferentially concentrated at the outer surface of said coating.

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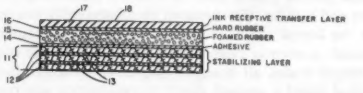
4,303,721
CLOSED CELL FOAM PRINTING BLANKET
Jorge M. Rodriguez, Miami, Fla., assignor to W. R. Grace & Co., Cambridge, Mass.
Filed Jul. 20, 1979, Ser. No. 59,343
Int. Cl.[3] B32B *7/02, 5/18*
U.S. Cl. 428—213 6 Claims




1. A resilient compressible offset printing blanket of the type comprising

(a) a base layer comprising a member chosen from the group consisting of a machine direction, elongation stabilizing material and an adhesive material;

(b) a compressible layer over said base layer and comprising foamed rubber having a substantially closed celled structure; and

(c) an ink transfer face layer over said compressible layer,

the improvement comprising said resilient compressible offset printing blanket being free of any intervening woven stabilizing layer between the foamed rubber compressible layer and the face layer while having means giving the substance of the stability that would be provided by such a woven stabilizing layer between the foamed rubber compressible layer and the face layer.

4,303,722

## BUILDING COMPONENTS

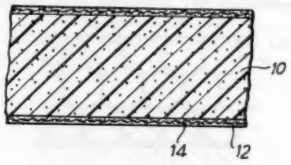
Thomas A. Pilgrim, 41 Hollies Dr., Edwalton, Nottinghamshire, England

Filed Jun. 2, 1980, Ser. No. 155,370

Claims priority, application United Kingdom, Jun. 8, 1979, 19988/79

Int. Cl.[3] B32B *7/02, 13/02, 13/04*

U.S. Cl. 428—213 19 Claims




1. A building or .onstructional component comprising a substrate of substantially rigid material having on at least one surface a facing composed of a fabric or web of inorganic fibres and a set composition of thermosetting condensation resin and gypsum, the composition penetrating the fabric or web and bonding it to the surface of the substrate wherein the amount of said composition is sufficient only to form a continuous film over the surface of the fabric or web.

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4,303,723

## SOUND BARRIER MATERIAL

Paul E. Oliveira, New Bedford, Mass., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 4, 1980, Ser. No. 118,039

Int. Cl.[3] B32B *7/00;* C04B *43/00*

U.S. Cl. 428—247 6 Claims

1. A sound and safety barrier material comprised of a metallic foraminous member sandwiched between two polyvinyl chloride impregnated mesh sheets, said sheets having a coating thereon of about 0.05 to 7.7 centimeters of a barium sulfate loaded chlorinated polyethylene.

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4,303,724

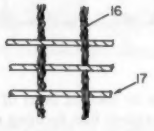
## ADHESIVE TAPES CONTAINING TEXTURIZED YARNS

Timothy L. Sergeant, Seneca, S.C., and Luz E. Thomas, Brockton, Mass., assignors to The Kendall Co., Boston, Mass.

Filed Sep. 4, 1980, Ser. No. 183,887

Int. Cl.[3] D03D *3/00;* B32B *5/02*

U.S. Cl. 428—229 8 Claims




1. In adhesive tapes which comprise a pliable backing material, a reinforcing fabric, and a layer of adhesive mass adherent to said backing material and said fabric, the improvement in which the reinforcing fabric comprises texturized yarns in the filling direction.

4,303,725

## PROCESS FOR AUGMENTING OR ENHANCING AROMA OF HEADSPACE IN DRYER USING FABRIC SOFTENER ARTICLE CONTAINING 2-OXABICYCLOOCTANE DERIVATIVE

Mark A. Sprecker, Sea Bright; Frederick L. Schmitt, Holmdel; Manfred H. Vock, Locust; Joaquin F. Vinals, Red Bank, all of N.J., and Jacob Kiwala, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 77,539, Sep. 21, 1979, Pat. No. 4,269,862, which is a continuation-in-part of Ser. No. 953,128, Oct. 28, 1978, Pat. No. 4,195,099. This application Aug. 7, 1980, Ser. No. 176,092

Int. Cl.[3] B32B *9/06, 11/06;* D06M *13/06*

U.S. Cl. 428—291 2 Claims

1. A dryer-added fabric softening nonwoven fabric article comprising a non-woven cloth substrate, a substrate coating and an outer coating which comprises 1,3,5,5-tetramethyl-2-oxabicyclo[2.2.2]octane, which dryer-added fabric softening article is capable of imparting a minty and camphoraceous aroma with woody and piney undertones to the headspace in a dryer on operation thereof, the amount of said 1,3,5,5-tetramethyl-2-oxabicyclo[2.2.2]octane being present in the dryer-added fabric softening article being from 0.01% up to 0.5% of 1,3,5,5-tetramethyl-2-oxabicyclo[2.2.2]octane based on the weight of said dryer-added fabric softening article.

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4,303,726

## METHODS AND COMPOSITIONS FOR PRESERVATION OF TIMBER

John H. W. Turner, Chapel en le Frith, England, assignor to Manchem Limited, Manchester, England

Filed Jun. 25, 1980, Ser. No. 162,820

Claims priority, application United Kingdom, Jun. 25, 1979, 22049/79

Int. Cl.[3] B05D *1/18, 3/00;* C09D *5/14*

U.S. Cl. 427—297 10 Claims

1. A method of preserving timber which comprises impregnating timber with a funicidal composition comprising at least one metal-organic compounds which contains aluminum and/or boron, at least one divalent metal element or metal radical, the aluminum and/or boron atom and the divalent metal atom or atoms being linked through oxygen atoms, and at least one carboxylic acid radical, together with a suitable carrier therefor.

5. A method according to claim 1, wherein the timber is impregnated by vacuum impregnation.

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4,303,727

## INTUMESCENT FLAME-RESISTANT COATING

Charles L. Hamermesh, Westlake Village; Chiang-Ying M. Tung, Thousand Oaks, and Peter A. Hogenson, Long Beach, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 14, 1980, Ser. No. 196,905

Int. Cl.[3] B32B *3/26, 5/18, 27/40;* B05D *3/02*

U.S. Cl. 428—314 8 Claims

4. A structure having a coating which intumesces when heated to form a polyimide foam, comprising:

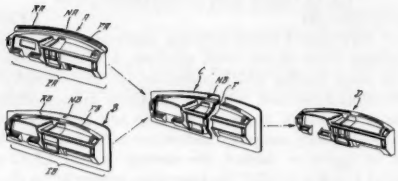
a substrate;

a coating on said substrate, said coating comprising a product resulting from mixing 20 to 60% of an aromatic polyisocyanate with 10 to 40% of an aromatic polycarboxylic compound with 25 to 60% furfuryl alcohol, said product being maintained at a temperature less than approximately 80° C.

## 4,303,728
## METHOD FOR PRODUCING FOAMED COMPOSITE PANELS AND RESULTANT PRODUCT

Ladd E. Houdek, Saline; Frank G. Cespino, and Patrick A. Yezbick, both of Canton, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jan. 4, 1980, Ser. No. 109,450
Int. Cl.[3] B29D *27/00*
U.S. Cl. 428—315 24 Claims



1. A method for manufacture of a contoured panel that has a flexible side, a rigid side and a flexible foam therebetween, which method comprises:

A. providing a contoured cavity in a mold, said cavity having definition comprising:

1. a flexible sheet having its inner area conforming to and optionally drawn by vacuum against a first member of said mold, said inner area comprising a generally desired configuration for a first side of said panel and a border of said flexible sheet having runner and gate halves;
2. a rigid sheet comprising substantially the desired configuration for a second side of said panel, having its inner area (a) selectively spaced from said inner area of said flexible sheet and (b) held by a second member of said mold in spaced relation to said flexible sheet and the border of said rigid sheet having runner and gate halves;
3. closure of said mold members clamping borders of said rigid and flexible sheets along a peripheral portion of said cavity, said closure being interrupted by (a) an injection port for injection of liquid foam precursors and (b) an exhaust vent for exhaust of air from said cavity;
4. said clamped sheets forming: (a) a runner communicating with said injection port and extending from said injection port to a location within said cavity remote from said injection port so as to direct passage of foam precursors to said location after their injections; and (b) a gate communicating between said runner and said cavity, said gate adapted to meter foam precursors from said runner into said cavity;

B. injecting under pressure an amount of foam precursors, sufficient to fill said cavity with said foam, through said injection port, into said runner and through said gate so as to provide a flow front of foam precursors at least about as long as said runner, which flow front travels into said cavity.

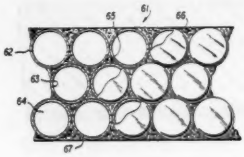
4. The method in accordance with claims 1, or 2 or 3, wherein said liquid foam precursors comprise a polyurethane foam precursors.

6. A panel made in accordance with claim 4.

## 4,303,729
## HOLLOW PLASTIC MICROSPHERES

Leonard B. Torobin, 13433 N.E. 45th St., Bellevue, Wash. 98004

Division of Ser. No. 59,296, Jul. 20, 1979, abandoned, which is a continuation-in-part of Ser. No. 937,123, Aug. 28, 1978, abandoned, and Ser. No. 944,643, Sep. 21, 1978, abandoned. This application Dec. 12, 1979, Ser. No. 103,416
Int. Cl.[3] B32B *5/16, 9/00, 15/08*
U.S. Cl. 428—327 48 Claims



47. A tape comprising a mass of filamented hollow, organic film forming material microspheres, an adhesive binder for said microspheres, a backing for said microspheres and an adhesive for said tape, said microspheres having a diameter of 500 to 6000 microns and a wall thickness of 0.5 to 400 microns, wherein said microspheres are connected to each other by filamented portions which are continuous with the microspheres and are of the same organic film forming material from which the microspheres are made.

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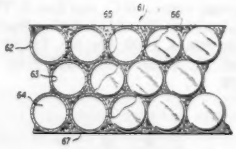
## 4,303,730
## HOLLOW MICROSPHERES

Leonard B. Torobin, Materials Technology Corp., P.O. Box 6844, Bellevue, Wash. 93007

Division of Ser. No. 59,297, Jul. 20, 1979, abandoned, which is a continuation-in-part of Ser. No. 937,123, Aug. 28, 1978, abandoned, and Ser. No. 944,643, Sep. 21, 1978, abandoned. This application Dec. 13, 1979, Ser. No. 103,114
Int. Cl.[3] B32B *5/16, 9/00, 15/08*
U.S. Cl. 428—333 54 Claims



4. A shaped form or formed mass of cemented or bonded together hollow inorganic film forming material microspheres of substantially uniform diameter of 200 to 10,000 microns and of substantially uniform wall tickness of 0.1 to 1,000 microns, wherein said microspheres are free of latent solid or liquid blowing gas materials or gases and the walls of said microspheres are substantially free of holes, relatively thinned wall portions or sections, sealing tips and bubbles.

4,303,731

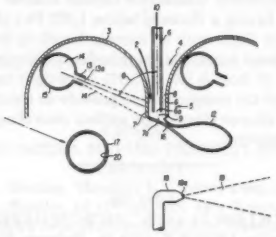
## COMPRESSED GASEOUS MATERIALS IN A CONTAINED VOLUME

Leonard B. Torobin, Materials Technology Corp., P.O. Box 6844, Bellevue, Wash. 98007

Division of Ser. No. 69,295, Aug. 24, 1979, abandoned, which is a continuation-in-part of Ser. No. 59,297, Jul. 20, 1979, abandoned, and a continuation-in-part of Ser. No. 937,123, Aug. 28, 1978, abandoned, and a continuation-in-part of Ser. No. 944,643, Sep. 21, 1978, abandoned. This application Dec. 13, 1979, Ser. No. 103,343

Int. Cl.[3] C03C *25/02;* B32B *5/16, 9/00, 15/08*

U.S. Cl. 428—333 75 Claims



1. Hollow inorganic film forming material microspheres of substantially uniform diameter of 200 to 10,000 microns and of substantially uniform wall thickness of 0.1 to 1,000 microns and having a contained gas pressure above 15 p.s.i.g. at ambient temperature, wherein said microspheres are free of latent solid or liquid blowing gas materials or gases and the walls of said microspheres are substantially free of holes, relatively thinned wall portions or sections, sealing tips and bubbles.

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4,303,732

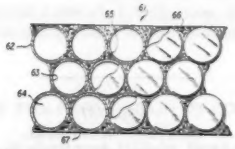
## HOLLOW MICROSPHERES

Leonard B. Torobin, c/o Materials Technology Corp., P.O. Box 6844, Bellevue, Wash. 93007

Division of Ser. No. 59,297, Jul. 20, 1979, abandoned, which is a continuation-in-part of Ser. No. 937,123, Aug. 28, 1978, abandoned, and Ser. No. 944,643, Sep. 21, 1978, abandoned. This application Dec. 13, 1979, Ser. No. 103,361

Int. Cl.[3] B32B *5/16, 9/00, 15/08*

U.S. Cl. 428—333 43 Claims



13. Hollow glass microspheres of substantially uniform diameter of 200 to 10,000 microns and of substantially uniform wall thickness of 0.1 to 1,000 microns, wherein said microspheres are free of latent solid or liquid blowing gas materials or gases and the walls of said microspheres are substantially free of holes, relatively thinned wall portions or sections, sealing tips and bubbles.

4,303,733

## FILAMENT WITH CONDUCTIVE LAYERS

Wolfgang Bülle, Wuppertal, and Hans G. Tilgner, Mulheim, both of Fed. Rep. of Germany, assignors to Akzona Incorporated, Asheville, N.C.

Filed Jan. 21, 1980, Ser. No. 113,667

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1979, 2902545

Int. Cl.[3] B32B *1/08, 27/02, 27/20, 33/00;* H01B *7/00*

U.S. Cl. 428—367 10 Claims

1. A filament from synthetic polymers adapted for use in an electrical circuit, having a cross section comprising at least three layers, at least two of which are electrically conductive, and wherein at least one of said layers is located between said conductive layers and comprises an electrically insulating, synthetic polymer, and wherein the electrically conductive layers are provided with electrical connections.

2. A filament from synthetic polymers, having a cross section comprising at least three layers, at least two of which are electrically conductive, and wherein at least one of said layers is located between said conductive layers and comprises an electrically insulating, synthetic polymer, one of said electrically conductive layers surrounds said other layers and extends over the entire circumference of said filament.

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4,303,734

## MULTIPLE LAYER EXTRUSION TOOLING HAVING A TIP ENABLING EXTRUSION OF ONE LAYER ONTO A SUBSTRATE AT A POINT OUTSIDE OF THE EXTRUSION HEAD

Roy E. Sullivan, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.

Filed Dec. 6, 1979, Ser. No. 100,769

Int. Cl.[3] B29F *3/04, 3/10;* H01B *7/18, 13/24*

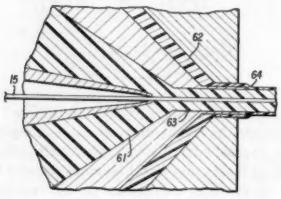
U.S. Cl. 428—368 19 Claims

1. An apparatus for extruding primary insulation and insulation shielding onto an advancing shielded conductor strand in one operation without causing inward protrusions of insulation shielding compound particles into the primary insulation comprising:

an extruder head housing means having a shielded conductor strand entrance, said extruder head including means for accepting primary insulation compound from a first extruder, means for accepting insulation shield compound from a second extruder, means for adjusting the concentricity of said shielded conductor strand, said primary insulation and said insulation shielding, and a cable exit;

an inner tip means mounted in said head housing and near said shield conductor entrance for accepting said advancing shielded conductor strand and guiding said shielded conductor strand along a predetermined straight path, said inner tip means also being adapted to guide the flow of primary insulation compound through said head housing and toward said shielded conductor strand;

an antiprotrusion tip means having an inner and outer surface mounted in said housing and in combination with said inner tip means, said antiprotrusion tip means partially surrounding said inner tip with the inner surface of said antiprotrusion tip thereby cooperating with said inner tip to guide said primary insulation compound toward and onto said shielded conductor strand in a first extrusion plane as said outer surface of said antiprotrusion tip smooth the primary insulation side surface of an insulation shielding compound and guides it toward the advancing shielded and insulated conductor, and having a tubular extension with an inner circumference equal to the expected circumference of the primary insulation and an outer circumference approximately equal to that of the finished product concentric to the longitudinal axis of said predetermined straight path and extending out from said extrusion head to define said cable exit and the point advanced in the direction of material flow from said first extrusion plane at which the smooth surface of the insulation shielding compound is applied in a second extrusion




plane to the primary insulation surface of the advancing shielded conductor.

**12**. A method for the tandem concentric extrusion of primary insulation and insulation shielding onto an advancing shielded conductor strand in one operation without causing inward protrusions of insulation shielding compound particles into the primary insulation comprising:

advancing the shielded conductor strand along a predetermined straight path through an extruder head housing means comprising a starter tip;

extruding, through a means including a die, a primary insulation onto said advancing shielded conductor strand in a first extrusion plane; and

simultaneously extruding an ironed insulation shield onto said advancing shielded conductor strand in a second extrusion plane at a point advanced in the direction of material flow from said first extrusion plane through use of an antiprotrusion tip which causes undispersed particles projecting from the insulation side surface of the insulation shield to be reabsorbed into the polymer matrix of said insulating shielding to prevent piercing of said insulation by said particles.

**18**. Improved cross-linked polyethylene insulated power cables rated 5 through 35 KV manufactured by the process of claim **12**.

**19**. Improved thermoplastic polyethylene insulated power cables rated 5 through 35 KV manufactured by the process of claim **12**.

**4,303,735**

## BASE MEMBER COATED WITH AN ELECTRICALLY CONDUCTIVE SILICONE ELASTOMER

**Gerald P. Kehrer, Auburn, Mich., and William G. Smith, St. Charles, Ill., assignors to Dow Corning Corporation, Midland, Mich.**

**Division of Ser. No. 27,188, Apr. 4, 1979. This application Sep. 2, 1980, Ser. No. 183,258**

**Int. Cl.**[3] **B32B** *9/04;* **D02G** *3/00;* **H01B** *7/00*

**U.S. Cl. 428—391** **6 Claims**

**5**. An electrically conductive member comprising a plurality of filaments coated with a cured composition, said composition comprising a product obtained by mixing

(A) an electrically conductive curable silicone elastomeric mixture having a viscosity below 1,000 Pa.s at 25° C. and

(B) graphite fibers with an average length of from about 1 mm to about 6 mm, the graphite fibers being present in an amount of from 0.3% to 5.0% by weight based on the weight of the composition to provide an electrically conductive silicone elastomeric surface encircling the plurality of filaments.

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**4,303,736**

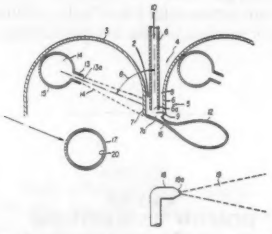
## HOLLOW PLASTIC MICROSPHERES

**Leonard Torobin, 13433 N.E. 45th St., Bellevue, Wash. 98004**

**Division of Ser. No. 59,296, Jul. 20, 1979, abandoned, which is a continuation-in-part of Ser. No. 937,123, Aug. 28, 1978, abandoned, which is a continuation-in-part of Ser. No. 944,643, Sep. 21, 1978, abandoned. This application Dec. 13, 1979, Ser. No. 103,417**

**Int. Cl.**[3] **B32B** *5/16;* **B22B** *17/06*

**U.S. Cl. 428—403** **37 Claims**



**2**. Hollow organic film forming material microspheres of substantially uniform diameter of 500 to 6,000 microns and of substantially uniform wall thickness of 0.5 to 400 microns, wherein said microspheres are free of latent solid or liquid blowing gas materials or gases and the walls of said microspheres are substantially free of holes, relatively thinned wall portions or sections and bubbles.

**4**. The hollow microspheres of claim **2** having deposited on the inner wall surfaces thereof a thin metal coating 50° to 5000° A thick.

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**4,303,737**

## COATING MATERIAL

**William B. Litchfield, Toton; John T. Gent, South Normanton, and James A. S. Graham, Borrowash, all of England, assignors to Rolls-Royce Limited, Derby, England**

**Filed Jul. 16, 1980, Ser. No. 169,432**

**Claims priority, application United Kingdom, Aug. 21, 1979, 29000/79**

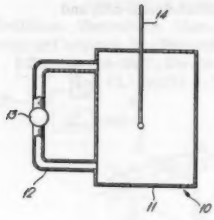
**Int. Cl.**[3] **B05D** *1/12*

**U.S. Cl. 428—406** **17 Claims**

**1**. A powder suitable for flame spraying comprising:

particles of a glass, each of said particles being hollow and

coated with a metal, said metal being selected from the group consisting of a cobalt based alloy and a nickel based




alloy, said alloy containing aluminum, chromium and silicon.

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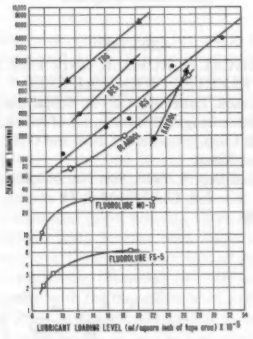
4,303,738

## MAGNETIC MEDIA HAVING TRIDECYL STEARATE LUBRICANT

Donald Gini, Boulder; Theodore L. Larson, Longmont; Ronald A. Merten, Boulder, all of Colo., and Alex Simonetti, Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 28, 1980, Ser. No. 172,502
Int. Cl.³ B32B *27/40*
U.S. Cl. 428—423.1 7 Claims




1. Magnetic recording media comprising a base substrate having a magnetic recording layer thereon, said layer consisting of finely divided magnetic particles dispersed in a binder and including a lubricant having essentially the composition

$$CH_3-(CH_2)_{11}-CH_2-O-\overset{O}{\overset{\|}{C}}-CH_2-(CH_2)_{15}-CH_3.$$

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4,303,739

## PROCESS OF THE PRODUCTION OF COMPOSITE SAFETY GLASS

Rolf Beckmann, Siegburg, and Wilhelm Knackstedt, Hennef, both of Fed. Rep. of Germany, assignors to Dynamit Nobel AG, Troisdorf, Fed. Rep. of Germany

Continuation of Ser. No. 847,275, Oct. 31, 1977, abandoned, which is a continuation-in-part of Ser. No. 738,402, Nov. 3, 1976, abandoned. This application Feb. 22, 1979, Ser. No. 13,933
Claims priority, application Fed. Rep. of Germany, Oct. 30, 1976, 2650118; Oct. 30, 1976, 2650119; Oct. 30, 1976, 2650120
Int. Cl.³ B32B *9/04, 17/06*
U.S. Cl. 428—429 24 Claims

17. A laminated safety glass comprising at least one silicate glass sheet bonded to a soft film of polyvinyl butyral by a bonding agent consisting essentially of a functional silane dissolved in a solvent and a varnish in an amount of 0.0001 and 7% by weight, said varnish comprising:

A. the varnish containing a binder selected from the group consisting of a vinyl chloride hydroxy alkyl acrylate copolymer, a vinyl chloride-vinyl acetate-unsaturated carboxylic acid copolymer, a vinyl chloride-unsaturated carboxylic acid alkyl ester-unsaturated carboxylic acid copolymer and a partially saponified copolymer of vinyl chloride-vinyl acetate; and

B. a non-volatile component of the group of plasticizers, stabilizers and auxiliary agents in a combined amount between 1.0 and 20.0 percent by weight.

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4,303,740

## PROCESS FOR THE PREPARATION OF HIGHLY ACCURATE AND STABLE ELECTRODE CONTAINING A SILVER SALT

József Petró; Ernó Pungor; Klára Tóth, and Ferenc Rakiás, all of Budapest, Hungary, assignors to Magyar Tudományos Akadémia, Budapest, Hungary

Continuation-in-part of Ser. No. 22,414, Mar. 21, 1979. This application Oct. 31, 1979, Ser. No. 89,880
Claims priority, application Hungary, Mar. 31, 1978, MA 2971
Int. Cl.³ G01N *27/26*
U.S. Cl. 428—548 14 Claims

1. An improved process for the preparation of silver-silver salt reference electrode comprising mixing silver and a silver salt, both in powdered form in a weight ratio of 0.05:0.95 to 0.95:0.05, homogenizing the mixture, preparing a paste of good lubricity by blending the mixture with a liquid binding agent capable of adhering to metals, applying the paste onto the surface of an electrode base and allowing the paste to harden wherein the improvement is that the electrode is subjected to a heat treatment at a temperature between 100° C. and 250° C. after the hardening the paste.

7. An improved process for the preparation of ion selection measuring electrode containing a silver salt comprising mixing at least one of graphite and silver in powdered form with a powdered silver salt in a weight ratio of 0.05:0.95 to 0.95:0.05, homogenizing the mixture, preparing a paste of good lubricity by blending the mixture with a liquid binding agent capable of adhering to metals, applying the paste onto the surface of an electrode base and allowing the paste to harden wherein the improvement is that the electrode is subjected to a heat treatment at a temperature between 100° C. and 250° C. after the hardening of the paste.

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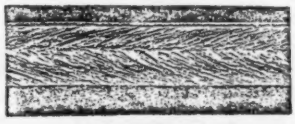
4,303,741

## HERRINGBONE GRAIN ALUMINUM COMPOSITE STRIP

Dominique Klein, Ham, France, assignor to Manufacture Metallurgique de Tournus, Tournus, France

Division of Ser. No. 45,085, Jun. 4, 1979, Pat. No. 4,224,978. This application Feb. 12, 1980, Ser. No. 120,821
Claims priority, application France, Jun. 19, 1978, 78 18926
Int. Cl.³ B32B *15/20*
U.S. Cl. 428—611 3 Claims



1. A composite strip composed of a thickness of cast aluminum of between 1.5 mm and 20 mm and a plating on at least one face of between 0.1 mm and 1.0 mm thick of a metal having

a mechanical strength and melting point which are substantially higher than those of aluminum, characterized in that a longitudinal section of the aluminum strip consists essentially of solidified peaked dendrites arranged with respect to each other in a herringbone-shaped configuration, the average inclination of which is less than 85° relative to a median plane transverse to said longitudinal section of the aluminum strip.

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**4,303,742**

## RESISTANCE MATERIAL

**Alexander H. Boonstra, and Cornelis A. H. A. Mutsaers, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Mar. 5, 1980, Ser. No. 127,347**

**Claims priority, application Netherlands, Mar. 8, 1979, 7901863**

**Int. Cl.³ B32B *9/04*; H01B *1/06***

**U.S. Cl. 428—697** **8 Claims**

1. A resistance material comprising at least one compound having the formula $M_xSr_{1-x}Rh_2O_{4-4.5}$ wherein M is selected from the group consisting of Pb and Bi, and wherein x is between 0 and $\frac{1}{2}$.

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**4,303,743**

## AIR DEPOLARIZED CELL WITH A GELLED ELECTROLYTE

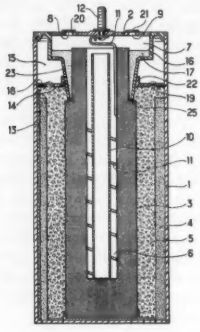
**Jean-Marie Reau, Poitiers, France, assignor to Societe Anonyme dite: GIPELEC, Perret, France**

**Filed Dec. 16, 1980, Ser. No. 217,035**

**Claims priority, application France, Jan. 16, 1980, 80 00901**

**Int. Cl.³ H01M *12/06***

**U.S. Cl. 429—27** **4 Claims**



1. An air depolarized cell with a gelled electrolyte, said cell including a positive electrode, a negative electrode and an expansion space, the gelled electrolyte being disposed between the two electrodes firstly in contact with their electrochemical exchange surfaces and secondly between the negative electrode and the expansion space, the surface of the electrolyte in the expansion space being partially covered with a plate which exerts a pressure on the electrolyte thereby pressing the electrolyte closely against the surfaces of the electrodes.

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**4,303,744**

## METHOD FOR REDUCING GAS PRESSURE IN AN ELECTROCHEMICAL CELL

**Nikola Marincic, Winchester, and Robert C. McDonald, Stow, both of Mass., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Nov. 17, 1980, Ser. No. 207,494**

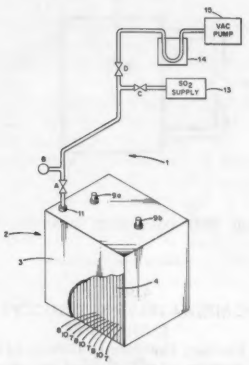
**Int. Cl.³ H01M *10/52***

**U.S. Cl. 429—52** **18 Claims**

1. A method comprising the steps of:

providing an electrochemical cell including a plurality of electrodes but lacking an electrolytic solution, said electrodes including a carbon-containing electrode in which water is absorbed in the carbon of said carbon-containing electrode;

evacuating the electrochemical cell; and




purging the cell with a purge fluid soluble in the electrolytic solution to be used in the cell and operable to displace water absorbed in the carbon of the carbon-containing electrode.

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**4,303,745**

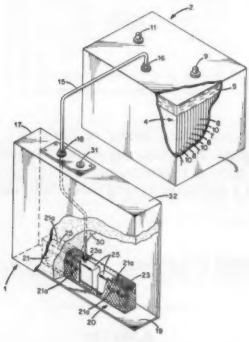
## CHEMICAL SCRUBBER UNIT FOR AN ELECTROCHEMICAL CELL

**Robert M. Anderson, Lakeville; Carl R. Schlaikjer, Winchester, and John S. Shambaugh, Holliston, all of Mass., assignors to GTE Products Corp., Stamford, Conn. and GTE Laboratories Inc., Waltham, Mass.**

**Filed Sep. 8, 1980, Ser. No. 184,835**

**Int. Cl.³ H01M *2/12***

**U.S. Cl. 429—86** **23 Claims**



1. A chemical scrubber unit for neutralizing acid fluids, comprising:

a housing;

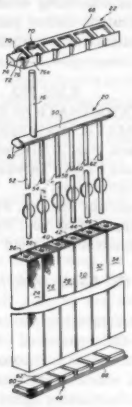
neutralizing material disposed within the housing capable of chemically reacting with and neutralizing acid fluids; and

distribution means disposed within the housing in proximity to the neutralizing material and arranged to receive the acid fluids and to distribute the acid fluids within a predetermined volume and in contact with the neutralizing material for chemical reaction with and neutralization by the neutralizing material.

## 4,303,746
## STORAGE BATTERY CONSTRUCTION INCLUDING BONDED PLATE ASSEMBLY AND METHODS OF MAKING SAME

John E. Gulliksen, Shrewsbury, Mass., assignor to Koehler Manufacturing Company, Marlborough, Mass.

Filed Apr. 14, 1980, Ser. No. 140,256
Int. Cl.³ H01M 4/75
U.S. Cl. 429—140 2 Claims



1. A positive plate construction for use in a lead-acid type storage battery, said positive plate construction including a grid having a top bar, post, and spaced apart spines, active material and fabricated tubular bodies arranged to confine the active material around the spines and having constituent strands of a thermoplastic bonding material included therein, and thermoplastic upper and lower bonding element means occurring in fused relationship with respect to portions of said constituent strands of thermoplastic material at points inside the tubular bodies, said upper bonding element consisting of an elongated molded body formed with insert means, and said elongated body overlying the upper side of the top bar of the grid in fitted relationship therewith and said insert means being formed integrally with the elongated body and being arranged within upper ends of the tubular bodies to secure the upper ends of the tubular bodies in interlocked relationship with the grid.

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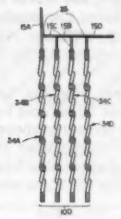
## 4,303,747
## EXPANDED-METAL GRID

Ulrich Bender, Siegen, Fed. Rep. of Germany, assignor to Firma Emil Bender, Siegen, Fed. Rep. of Germany

Filed Jun. 27, 1980, Ser. No. 163,433
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1979, 7935703[U]; Mar. 27, 1980, 3011836
Int. Cl.³ H01M 4/74
U.S. Cl. 429—161 9 Claims

1. A support for the active material of a battery plate, comprising a unitary metallic grid of generally rectangular outline with a multiplicity of generally rhomboidal meshes bounded by webs of substantially rectangular cross-section and a pair of solid border strips integral with said webs on opposite sides of said grid, the minor dimension of said cross-section being substantially equal to half the thickness of said strips, the major dimension of said cross-section being substantially equal to the thickness of said strips and including an angle of less than 45° with the faces of said strips, the webs of adjacent meshes being interconnected by nodes whose height perpendicular to said



faces equals substantially twice the minor dimension of said cross-section.

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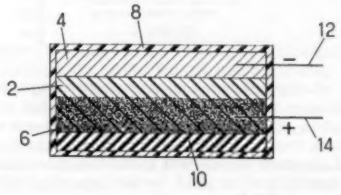
## 4,303,748
## ELECTROCHEMICAL GENERATORS FOR PRODUCING CURRENT AND NEW MATERIALS FOR THEIR MANUFACTURE

Michel B. Armand, and Michel Duclot, both of Grenoble, France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Nov. 20, 1979, Ser. No. 96,067
Claims priority, application France, Nov. 22, 1978, 78 32976
Int. Cl.³ H01M 6/16
U.S. Cl. 429—192 37 Claims




1. Electrochemical generator for producing electrical current, comprising at least a negative electrode and at least a positive electrode separated from the negative electrode by means of a solid electrolyte, the negative electrode forming a "source" of material having a higher chemical potential, capable of supplying an alkali or ammonium cation at its interface with the electrolyte and the positive electrode forming a "well" at lower chemical potential for the non-ionized species corresponding to the above-said alkali cation, the electrolyte being of the type of those which enable the transfer of this alkali cation by ionic conduction from the negative electrode to the positive electrode, when the electrochemical reaction resulting from the production of current takes place, this generator comprising an electrolyte constituted at least in part by a solid solution of an ionic compound entirely dissolved within a solid, plastic macromolecular material and in which:

the ionic compound has the formula $M^+X^-$ in which M is a cation derivative of an alkali metal or from the ammonium ion, this cation corresponding at least in part to the cation supplied by the negative electrode at its interface with the electrolyte and $X^-$ is an anion of a strong acid,

the said macromolecular material being constituted at least in part by a member of the group consisting of homopolymers and copolymers derivative of one or several monomers comprising at least one heteroatom notably oxygen or nitrogen, capable of forming donor-acceptor type bonds with the cation $M^+$.

4,303,749

## SINGLE COMPONENT MAGNETIC TONER WITH EPOXY RESIN

Robert J. Gruber, Pittsford, and Steven B. Bolte, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 27, 1980, Ser. No. 200,708
Int. Cl.[3] G03G *13/22, 19/00*
U.S. Cl. 430—39 6 Claims

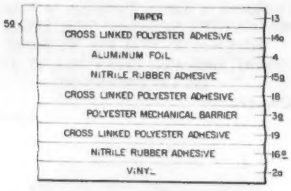
1. A single component magnetic toner, containing from about 30 percent to about 60 percent by weight of an epoxy resin, and from about 40 percent to about 70 percent by weight of a magnetic pigment treated with an organic titanate or lecithin reactive coupling agent, said toner having a melt flow temperature of from about 90° C., to about 110° C.

4,303,750

## ALKALINE FLUID PHOTOGRAPHIC PROCESSING COMPOSITION CONTAINERS

John E. Campbell, Needham, and Robert M. Delahunt, Norwell, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Jun. 16, 1980, Ser. No. 159,930
Int. Cl.[3] G03D *9/02*
U.S. Cl. 430—208 4 Claims



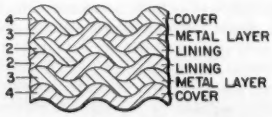

1. A photographic product comprising a rupturable container holding an aqueous alkaline photographic processing composition, said container comprising a laminar pouch having a lining in contact with said processing composition; and a layer of aluminum foil adhered to said lining; said lining consisting essentially of an alkali barrier layer of alkali resistant polymeric material between said processing composition and said metal foil, a tough resilient mechanical barrier layer of puncture and flow resistant polymeric material between said alkali barrier layer and said layer of aluminum foil, and a layer of adhesive inert to alkali adhering said barrier layer to said aluminum foil.

4,303,751

## RUPTURABLE PHOTOGRAPHIC PROCESSING ALKALINE FLUID CONTAINER

John E. Campbell, Needham, and Neal F. Kelly, Woburn, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Jun. 16, 1980, Ser. No. 159,931
Int. Cl.[3] G03D *9/02*
U.S. Cl. 430—208 6 Claims




1. A photographic product comprising a rupturable container holding an aqueous alkaline photographic processing composition, said container comprising a laminar pouch having a lining in contact with said processing composition, a layer of aluminum foil adhered to said lining, and a paper cover adhered to said aluminum foil, said lining comprising a monolithic layer of a mixture of nitrile rubber and a carboxylated vinyl resin in contact with said processing composition.

2. A photographic product comprising a rupturable container holding an aqueous alkaline photographic processing composition, said container comprising a laminar pouch having a lining in contact with said processing composition, a layer of aluminum foil adhered to said lining, and a paper cover adhered to said aluminum foil, said lining comprising a monolithic layer in contact with said processing composition of a mixture of polymers consisting essentially of from 25 to 75 parts by weight of nitrile rubber per 100 parts by weight of polymers and the balance of a carboxylated vinyl resin.

4,303,752

## SELECTIVE DETERMINATION OF NUCLEOTIDES IN VIABLE SOMATIC AND MICROBIAL CELLS

Seppo E. Kolehmainen, Rte. 2, Riveredge Dr., Box 66 X, Titusville, Fla. 32780, and Veikko Tarkkanen, Postbus 31101, 6370 AC Schaesberg, Netherlands

Continuation-in-part of Ser. No. 911,071, May 31, 1978, abandoned. This application Nov. 30, 1979, Ser. No. 98,763
Claims priority, application United Kingdom, May 31, 1977, 22992/77
Int. Cl.[3] C12Q *1/06, 1/66, 1/34*
U.S. Cl. 435—8 18 Claims

1. A method for measuring the concentration of ATP in microbial cells and the member of viable microbial cells contained in a biological sample composed of a mixture of somatic and microbial cells, which comprises contacting said sample with a non-ionic surface active agent selected from the group consisting of ethoxylated alkyl phenols and fatty acid poly glycol ethers under conditions to selectively release ATP from essentially only the somatic cell without rupturing the cell membranes of the somatic cells, removing the somatic ATP thereby released, further contacting the sample with an ionic surface active agent selected from the group consisting of ethoxylated amines, ethoxylated diamines, ethoxylated amides, polyethylene glycol esthers of fatty acids, quaternary ammonium salts, and mixtures thereof under conditions to selectively release ATP from the microbial cells without rupture of the cell membranes and cell walls of the microbial cells, and thereafter measuring by means of a bioluminsecent assay technique the concentration of ATP selectively released from the microbial cells and thereby determining the number of viable microbial cells in the sample.

18. A method of measuring the concentration of ATP in microbial cells and the number of viable microbial cells contained in a biological sample containing predominantly microbial cells, comprising contacting the sample with a mixture of ionic surface active agents comprising an ethoxylated amine and a quaternary ammonium salt of an ethoxylated amine under conditions to selectively release ATP from the microbial cells without rupture of the cell membranes and cell walls of the microbial cells, and thereafter measuring by means of a firefly bioluminescent assay the concentration of ATP selectively released from the microbial cells and thereby determining the number of viable microbial cells in the sample.

4,303,753

## METHOD AND DEVICE FOR THE SEMIQUANTITATIVE DETERMINATION OF GLUCOSE IN AQUEOUS FLUIDS

Charles T. W. Lam, Elkhart, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Filed Mar. 20, 1980, Ser. No. 132,281
Int. Cl.[3] C12Q *1/54, 1/28;* G01N *1/48*
U.S. Cl. 435—14 15 Claims

1. In combination with the method of preparing a test device for the semiquantitative determination of glucose in urine which comprises impregnating a sheet of a bibulous carrier with a solution containing glucose oxidase, a substance having peroxidative activity and a water soluble iodide salt, drying the treated carrier and then saturating the carrier with an organic

solution of a film-forming material, drying the carrier to leave a dry residue of the film-forming material and cutting the sheet into test strips, the improvement which comprises the use of a solution containing from about 1.75 to about 4.55 g./100 ml. of ethyl cellulose in a material which will solubilize the ethyl cellulose and will evaporate to leave a uniform residual layer of ethyl cellulose as solvent for the organic solution of film-forming material.

6. In combination with the method for the semiquantitative determination of glucose in urine which method comprises contacting the urine with a test device comprising a bibulous carrier impregnated with the residue of a solution containing glucose oxidase, a substance having peroxidative activity and water soluble iodide salt which device is coated with a hydrophobic, semi-permeable layer and determining the concentration of glucose in the urine from the color change of the device the improvement therein in which the layer is the dry residue created by saturating the device with a solution containing from about 1.75 to about 4.55 g./100 ml. of ethyl cellulose in a material which will solubilize the ethyl cellulose and will evaporate to leave a uniform residual layer of ethyl cellulose as solvent for the ethyl cellulose and removing the solvent.

11. In a test device for determining the presence of glucose in a liquid test sample, wherein said device comprises a carrier matrix impregnated with glucose oxidase, a peroxidatively active substance and a water soluble iodide salt, the improvement wherein said carrier matrix is additionally impregnated with ethyl cellulose by saturating said carrier with an organic solution containing about 1.75 to about 4.55 grams of ethyl cellulose per 100 milliliters of solvent.

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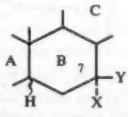
**4,303,754**

## METHOD FOR OBTAINING 7β HYDROXY STEROIDS

**Ian Macdonald, 604 Tower Rd., Halifax, Canada (B3H 4H7)**

**Filed Mar. 17, 1980, Ser. No. 131,120**
**Int. Cl.³ C12P *33/00***
**U.S. Cl. 435—52** **6 Claims**

1. A method for producing 7β-OH substituted steroids which comprises subjecting a cholane steroid compound having a B-ring structure of the following formula:




wherein X is OH, Y is H and when taken together X and Y is oxo (O=); to the action of a *Clostridium absonum* microorganism.

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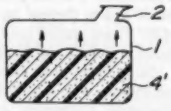
**4,303,755**

## SAFETY FUEL TANK CONTAINING RETICULATED POLYURETHANE FOAM MIXTURE OF POLY(OXYPROPYLENE-(OXYETHYLENE)POLYETHERPOLYOLS

**Toshio Yukuta; Kazuo Yagura, and Nobuhisa Fuchigami, all of Yokohama, Japan, assignors to Bridgestone Tire Co., Ltd., Tokyo, Japan**

**Filed Nov. 16, 1979, Ser. No. 94,996**
**Claims priority, application Japan, Nov. 16, 1978, 53-140415; May 4, 1979, 54-54151**
**Int. Cl.³ C08G *18/14***
**U.S. Cl. 521—52** **10 Claims**

1. A safety fuel tank wherein substantially skeletal reticulated flexible polyurethane foam is integrally foamed, which is obtained by reacting a mixture of (a) poly(oxypropylene-oxyethylene)polyetherpolyol having 51–98% by weight of ethylene oxide component and (b) poly(oxypropylene-oxyethylene)-polyetherpolyol having not less than 51% by weight of propylene oxide component as the polyhydroxyl compound with an




organic polyisocyanate in the presence of a catalyst, a foaming agent, a surfactant and an additive in a fuel tank.

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**4,303,756**

## PROCESS FOR PRODUCING EXPANDABLE THERMOPLASTIC RESIN BEADS

**Mutsuhiko Kajimura, Moriyama, and Hideaki Sasaki, Kusatsu, both of Japan, assignors to Sekisui Kaseihin Kogyo Kabushiki Kaisha, Nara, Japan**

**Continuation of Ser. No. 951,879, Oct. 16, 1978, abandoned. This application Nov. 17, 1980, Ser. No. 207,422**
**Int. Cl.³ C08J *9/16, 9/18***
**U.S. Cl. 521—59** **9 Claims**

1. A process for producing expandable thermoplastic resin beads which comprises suspending in an aqueous medium graft copolymer beads containing from 20 to 70% by weight of a random copolymer of propylene and ethylene containing 1 to 10% by weight of ethylene and 99 to 90% by weight of propylene and 30 to 80% by weight of a vinyl aromatic monomer, and introducing a blowing agent composed of an easily volatilizable hydrocarbon or halogenated hydrocarbon into the thermoplastic resin beads.

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**4,303,757**

## PROCESS FOR PRODUCING EXPANDABLE THERMOPLASTIC RESIN BEADS USING POLYPROPYLENE AS NUCLEUS

**Mutsuhiko Kajimura, Moriyama, and Hideaki Sasaki, Kusatsu, both of Japan, assignors to Sekisui Kaseihin Kogyo Kabushiki Kaisha, Nara, Japan**

**Continuation of Ser. No. 951,880, Oct. 16, 1980, abandoned. This application Nov. 17, 1980, Ser. No. 207,423**
**Claims priority, application Japan, Oct. 15, 1977, 52/123783**
**Int. Cl.³ C08J *9/16, 9/18***
**U.S. Cl. 521—59** **9 Claims**

1. A process for producing expandable thermoplastic resin beads which comprises suspending in an aqueous medium from 20 to 70% by weight of polypropylene resin particles and from 30 to 80% by weight of a vinyl aromatic monomer, polymerizing the vinyl aromatic monomer in the presence of a polymerization catalyst to graft the vinyl aromatic monomer onto the backbone of the polypropylene to form graft-copolymerized thermoplastic resin beads, and thereafter introducing a blowing agent composed of an easily volatilizable hydrocarbon or halogenated hydrocarbon into the thermoplastic resin beads.

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**4,303,758**

## METHOD OF PREPARING CLOSED CELL PHENOL-ALDEHYDE FOAM AND THE CLOSED CELL FOAM THUS PREPARED

**Frederick E. Gusmer, 1121 Ocean Ave., Mantoloking, N.J. 08738**

**Filed Jun. 7, 1976, Ser. No. 694,065**
**Int. Cl.³ C08J *9/14***
**U.S. Cl. 521—121** **43 Claims**

1. A method of preparing cured closed cell phenol-aldehyde foam consisting essentially of the steps of frothing an admixture consisting essentially of (1) a frothable liquid phenol-aldehyde resole resin which consists essentially of the said aldehyde interpolymerized with the said phenol in a mole ratio of 2.0:1 to 3.0:1 under aqueous liquid phase conditions in the

presence of an alkaline catalyst, the said liquid phenol-aldehyde resole resin initially having a pH above 3 as produced and also having a low exothermic heat of reaction upon curing to the solid state at a pH below 3 in the presence of an acid catalyst whereby when 50 grams thereof having a pH of about 5 and temperature of 80° F. are placed in an open metal container of a size which results in a depth of the liquid resole resin of ¾ inch and about 2 grams of an acid catalyst composition are vigorously admixed therein with a spatula for 30 seconds, the acid catalyst composition containing one gram of toluene xylene sulfonic acid and one gram of glycerin and being present in an amount to provide a pH value below 3, then the internal temperature of the admixture while a liquid increases to a value not in excess of about 150° F., the initially liquid admixture forms a solid within about 15 minutes, and the internal temperature of the said solid upon standing does not increase to a value in excess of about 180° F. before decreasing to a lower value, (2) a volatile blowing agent for the said liquid phenol-aldehyde resole resin, and (3) a surfactant which is a stabilizing agent for frothed liquid phenol-aldehyde resole resin to produce a stable uncured froth of the said liquid phenol-aldehyde resole resin, the said uncured froth containing closed cells which have cell walls formed of the liquid phenol-aldehyde resole resin and the said closed cells being expanded by the volatile blowing agent in gaseous phase, shaping the said uncured froth into a desired configuration to provide an uncured preform, curing the liquid phenol-aldehyde resole resin in the cell walls of the said uncured preform to the solid state at a pH below 3 in the presence of a catalytically effective amount of an acid catalyst which promotes the curing of the liquid phenolaldehyde resole resin to produce cured closed cell phenolaldehyde foam, and maintaining the temperature throughout the interior of the said uncured preform during the curing thereof above the boiling point of the volatile blowing agent but less than 212° F. and at a temperature sufficiently low to prevent further expansion of the said uncured preform in an amount to rupture the said cell walls of the closed cells and form an open cell structure, the liquid phenol-aldehyde resole resin in the said uncured preform having a sufficiently low exothermic heat of reaction in the presence of the said amount of acid catalyst whereby the temperature throughout the interior of the said uncured preform may be maintained below 212° F., and the said acid catalyst being present in the said uncured preform in an amount effective to provide a pH below 3 and promote the curing of the liquid phenol-aldehyde resole resin to the solid state and also present in a limited amount whereby the temperature throughout the interior of the said uncured preform during the curing thereof may be maintained below 212° F.

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**4,303,759**

## POLYALKYLENECARBONATE COMPOSITIONS WITH IMPROVED THERMAL STABILITY AND METHOD FOR MAKING SAME

**Dale D. Dixon, Kutztown, and Michael E. Ford, Trexlertown, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

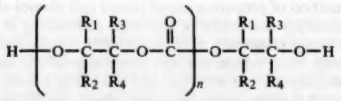
**Filed Sep. 12, 1980, Ser. No. 186,935**

**Int. Cl.³ C08L *69/00;* C08K *5/42***

**U.S. Cl. 525—3** **19 Claims**

**1.** A polyalkylene carbonate composition having improved thermal stability formed by reacting

(a) a normally solid polycarbonate having substantially alternating epoxide and carbon dioxide units and a plurality of free hydroxyl groups represented by the formula:



wherein:

$R_1$ is hydrogen, a halomethyl group, or a hydrocarbyl group having from 1 to 6 carbon atoms;

$R_3$ is hydrogen, a halomethyl group, or a hydrocarbyl group having from 1 to 6 carbon atoms;

$R_2$ and $R_4$ are hydrogen or a hydrocarbyl group having from 1 to 6 carbon atoms; or

$R_1$, $R_2$, $R_3$ and $R_4$ are combined together constituting a carbocyclic ring of from 4 to 7 carbon atoms and

n is the number of repeating units, which ranges from about 250 to 6,500, and

end-capped modifications thereof with

(b) 0.2–10%, by weight (based on the weight of polycarbonate to be stabilized) of a sulphur-containing peroxyl radical-reactive compound from the group consisting of metal salts of dithiocarbamic acids; aliphatic and aromatic thiols, sulfides, sulfoxides, sulfones, sulfonic acids, and sulfinic acids; aliphatic and aromatic disulfides; aliphatic and aromatic thioesters and thioamides; aliphatic and aromatic thiophosphite esters and thiophosphonates; and aliphatic and aromatic phosphotrithionites and phosphotrithronates.

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**4,303,760**

## ADHESIVE

**Makoto Nishimura, Utsunomiya; Yoshio Omori, Kawachi, and Yoshio Fujiwara, Utsunomiya, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Division of Ser. No. 57,126, Jul. 11, 1979, abandoned. This application Jul. 28, 1980, Ser. No. 173,073**

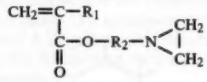
**Claims priority, application Japan, Jul. 15, 1978, 53-86506; Jul. 17, 1978, 53-87014**

**Int. Cl.³ C08F *220/54;* C08L *63/00***

**U.S. Cl. 525—117** **4 Claims**

**1.** An adhesive comprising:

(A) a copolymer of (1) a vinyl compound containing an aziridinyl group and (2) another vinyl compound copolymerizable therewith, said vinyl compound (1) having the formula:



wherein $R_1$ is H or $CH_3$, and $R_2$ is an alkylene group containing 1 to 8 carbon atoms, said vinyl compound (2) being an acrylic acid ester or a methacrylic acid ester, said copolymer having a number-average molecular weight of from 10,000 to 80,000 and a weight average molecular weight of 30,000 to 400,000, and containing nitrogen atoms derived from the aziridinyl group in the range from 0.009 to 1.8% by weight of said copolymer,

(B) an epoxy resin of the bisphenol or novolak type having an epoxy value of 100 to 3000, said epoxy resin being present in the range from 0.1 to 100 parts by weight per 100 weight parts of said copolymer.

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**4,303,761**

## FLUOROELASTOMER GELLING AGENTS AND PRODUCTS MADE THEREFROM

**David Apotheker, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 42,946, May 29, 1979. This application Dec. 26, 1979, Ser. No. 107,011**

**Int. Cl.³ C08L *27/12***

**U.S. Cl. 525—200** **6 Claims**

**1.** A fluoroelastomer composition which comprises a blend of a gelled fluoroelastomer and a non-gelled fluoroelastomer, said gelled fluoroelastomer being a copolymer with interpolymerized units consisting essentially of vinylidene fluoride units,

fluorine containing olefin units other than vinylidene fluoride units, optionally, at least one of perfluoroalkyl perfluorovinyl ether units, bromotrifluoroethylene units, bromotetrafluorobutene units or perfluorodivinyl ether units, and 0.05–3.0 weight percent of said gelled fluoroelastomer of 1,3,5-tris-(3,3-difluoro-2-propenyl)-s-triazine-2,4,6-(1H,3H,5H)-trione units, and said non-gelled fluoroelastomer being a copolymer with interpolymerized units consisting essentially of vinylidene fluoride units, fluorine containing olefin units other than vinylidene fluoride units, and, optionally, at least one of perfluoroalkyl perfluorovinyl ether units, bromotrifluoroethylene units, bromotetrafluorobutene units, or perfluorodivinyl ether units.

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## 4,303,762
## LOW SHRINKING UNSATURATED POLYESTER RESIN COMPOSITION

**Masaharu Nakayama, Nagoya; Masaru Matsushima, Aichi; Shigeki Banno, Aichi, and Nobuo Kanazawa, Aichi, all of Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan**

**Filed Nov. 24, 1980, Ser. No. 210,101**
**Claims priority, application Japan, Nov. 30, 1979, 54/155036**
**Int. Cl.³ C08F** *293/00*
**U.S. Cl. 525—299** **3 Claims**

1. In a molding composition having low shrinkability, which comprises

(a) from 20 to 70% by weight of unsaturated polyester resin;

(b) from 20 to 70% by weight of a first polymerizable monomer effective for reducing the shrinkability of said unsaturated polyester resin upon hardening thereof; and

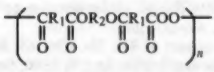
(c) an agent for improving the dispersion stability of the mixture of (a) and (b);

the improvement which comprises: said agent (c) consists essentially of from 1 to 20% by weight, based on the weight of said composition, of a block copolymer prepared by polymerizing,

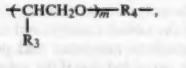
(i) from 10 to 90 parts by weight of a monomer or monomer mixture consisting essentially of from 70 to 100% by weight of vinyl acetate and from 30 to 0% by weight of a second monomer copolymerizable with vinyl acetate, or

(ii) from 90 to 10 parts by weight of a monomer or monomer mixture consisting essentially of from 0 to 100% by weight of a styrene-type monomer and 0 to 100% by weight of an acrylate or methacrylate monomer,

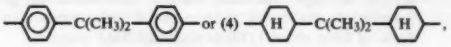
in the presence of a polymeric peroxide as a polymerization initiator, said polymeric peroxide having the formula



wherein $R_1$ is alkylene or substituted alkylene having 1 to 18 carbon atoms, cycloalkylene or substituted cycloalkylene having 3 to 15 carbon atoms, or phenyl or substituted phenylene having 6 to 15 carbon atoms, and $R_2$ is (1) alkylene or substituted alkylene having 2 to 10 carbon atoms, (2) a group having the formula



wherein $R_3$ is hydrogen or methyl, $R_4$ is alkylene or substituted alkylene having 2 to 10 carbon atoms and m is an integer of 1 to 13, (3)



and n is an integer from 2 to 10

to obtain a first copolymer having peroxy bonds in the molecule, and then effecting a second polymerization of said first copolymer with the other of (i) and (ii) that was not used in the first polymerization, thereby to obtain said block copolymer.

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## 4,303,763
## UNSATURATED ETHYLENE POLYMERS AND PROCESSES FOR PREPARING AND FOR USING SAME

**Marvin L. Beasley, Alva, Okla., assignor to RESDEV, Inc., Alva, Okla.**

**Filed Jan. 17, 1980, Ser. No. 113,092**
**Int. Cl.³ C08** *255/02*
**U.S. Cl. 525—313** **22 Claims**

1. A process for preparing an unsaturated ethylene polymer, comprising the steps of:

(a) mixing pulverized low or medium density saturated, linear polyethylene with liquid conjugated diene monomer having from 4 to about 10 carbon atoms and being present in an amount up to about 5 weight percent of the mixture;

(b) bringing said mixture to a temperature that melts the polyethylene; and

(c) maintaining said melt temperature until the polyethylene melts, said mixing, bringing and maintaining being without chemical or irradiant initiation.

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## 4,303,764
## PIGMENT DISPERSANTS FOR COATING COMPOSITIONS

**David Z. Becher, Allison Park; Roger M. Christenson; Richard L. Coalson, both of Gibsonia; Percy E. Pierce, Monroeville, and Karl F. Schimmel, Verona, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation of Ser. No. 938,746, Aug. 31, 1978, abandoned.**
**This application Jul. 7, 1980, Ser. No. 166,643**
**Int. Cl.³ C08F** *8/00, 220/34*
**U.S. Cl. 525—327** **35 Claims**

1. A dispersant compatible with a variety of resin-containing coating compositions and especially adapted for dispersing pigments therein, said dispersant being the polymerization product of a mixture of monomers consisting essentially of:

(i) from about 20 percent to about 85 percent of an alkyl methacrylate having from 3 to 8 carbon atoms in the alkyl group;

(ii) from about 5 percent to about 60 percent of a hardening monomer selected from the group consisting of a styrene, methyl methacrylate, ethyl methacrylate and mixtures thereof;

(iii) from about 1 percent to about 25 percent of an ethylenically unsaturated carboxylic acid selected from the group consisting of acrylic acid, methacrylic acid, itaconic acid, crotonic acid, maleic acid, fumaric acid and mixtures thereof;

(iv) from about 1 percent to about 25 percent of a monomer having a double bond alpha-beta to a carbonyl group and at least one hydroxyl group selected from the group consisting of a monohydroxy alkyl acrylate, monohydroxy alkyl methacrylate, monohydroxy alkyl crotonate, monohydroxy alkyl fumarate, dihydroxy alkyl fumarate, monohydroxy alkyl itaconate, dihydroxy alkyl itaconate, monohydroxy alkyl maleate, dihydroxy alkyl maleate and mixtures thereof; and

(v) from about 0.1 percent to about 15 percent of a compound providing an amine functional moiety, said compound being an acrylic or methacrylic compound contain-

ing amino groups; and wherein said dispersant has a weight average molecular weight, determined by gel permeation chromatography, using a polystyrene standard, of from about 1,000 to about 10,000.

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4,303,765

## PROCESS FOR THE PRODUCTION OF STORABLE 2-CHLORO-1,3-BUTADIENE/SULFUR COPOLYMERS

**Rüdiger Musch; Rüdiger Schubart, both of Bergisch-Gladbach; Wilhelm Göbel, and Gottfried Pampus, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jun. 6, 1980, Ser. No. 159,770**

**Claims priority, application Fed. Rep. of Germany, Jun. 19, 1979, 2924660**

**Int. Cl.**[3] **C08C** *19/20;* **C08F** *8/34*

**U.S. Cl. 525—343** **4 Claims**

1. A process for producing storable 2-chloro-1,3-butadiene/-sulfur copolymer latex by peptization of a highly viscous 2-chloro-1,3-butadiene/sulfur copolymer latex using a sulfur containing peptizing agent wherein as the peptizing agent a compound of the formula $R_1—S_n—R_1$ is added to the highly viscous latex of said copolymer after polymerization and the copolymer is peptized at from 5° to 100° C. at a pH of from 14 to 3, n being an integer of from 4 to 6 and $R_1$ being selected from the group consisting of aryl having 6 to 14 carbon atoms and aralkyl wherein the aryl moiety has from 6 to 14 carbon atoms and the alkyl moiety has from 1 to 3 carbon atoms.

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4,303,766

## PROCESS FOR SULFONATING POLYMERS

**Charles P. O'Farrell, Clark, and Edward N. Kresge, Watchung, both of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.**

**Division of Ser. No. 764,515, Jan. 31, 1977, Pat. No. 4,105,647, which is a continuation of Ser. No. 445,890, Feb. 26, 1974, abandoned, which is a continuation of Ser. No. 208,384, Dec. 15, 1971, abandoned. This application Dec. 12, 1977, Ser. No. 859,288**

**The portion of the term of this patent subsequent to Aug. 8, 1995, has been disclaimed.**

**Int. Cl.**[3] **C08C** *19/20, 19/22*

**U.S. Cl. 525—353** **5 Claims**

1. A process for sulfonating elastomeric polymers having olefinic unsaturation, said elastomeric polymers being prepared by solution process, said elastomeric polymers being selected from the group consisting of Butyl rubber, EPDM terpolymers, polybutadiene, and olefinically unsaturated elastomeric polymers which comprises:

(a) dissolving monomer reactants in a solvent and polymerizing said reactants in the presence of a Friedel-Crafts or Ziegler type catalyst thereby forming a reactor effluent containing elastomeric polymer, unreacted light monomer, active catalyst, and solvent;

(b) treating said reactor effluent to remove therefrom substantially all said unreacted light monomers;

(c) simultaneously sulfonating the olefinic unsaturation of said elastomeric polymer and quenching said active catalyst by treating with an acyl sulfate sulfonating quenching agent, said acyl sulfate having the formula:

$$R\text{-}(COOSO_3H)_n$$

wherein n is an integer from 1 to 3 and wherein R is an organic radical having a carbon number range from about 1 to about 30 and being selected from the group consisting of straight and branched chain alkyls, cycloalkyls, alkylated cycloalkyls, and cycloalkylated alkyls, ethers, thioethers, esters, thioesters, ketones and thioketones; and

(d) adding a neutralizing agent to neutralize the unneutralized sulfonate groups in said sulfonated elastomeric polymer, said neutralizing agent being selected from the group consisting of metal salts and organic amines.

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4,303,767

## FLAME RETARDANT ANTISTATIC ADDITIVES AND ANTISTATIC FIBERS

**David D. Newkirk, Southgate; Robert B. Login, Woodhaven, and Basil Thir, Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Division of Ser. No. 746,723, Dec. 2, 1976, Pat. No. 4,229,554. This application Nov. 13, 1979, Ser. No. 94,033**

**Int. Cl.**[3] **C08L** *67/00*

**U.S. Cl. 525—444** **11 Claims**

1. A flame-retardant antistatic polymer comprising the reaction product of

(a) a polyester of a polyoxyalkylene compound wherein said polyester is the reaction product of a polyoxyalkylene compound with a reactant selected from the group consisting of an aliphatic or aromatic dicarboxylic acid, corresponding acid anhydride, ester, and acid halide with

(b) a halogenated polyester.

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4,303,768

## PROCESS FOR THE PRODUCTION OF ALKALL METAL SILICATE-ORGANIC PLASTICS

**David H. Blount, 5450 Lea St., San Diego, Calif. 92105**

**Continuation-in-part of Ser. No. 146,474, May 5, 1980, which is a continuation-in-part of Ser. No. 36,350, May 7, 1979, which is a continuation-in-part of Ser. No. 889,932, Mar. 27, 1978, which is a continuation-in-part of Ser. No. 663,924, Mar. 4, 1976, which is a continuation-in-part of Ser. No. 599,000, Jul. 7, 1975, Pat. No. 4,072,637, which is a continuation-in-part of Ser. No. 262,485, Jun. 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 71,628, Sep. 11, 1970, abandoned. This application Feb. 10, 1981, Ser. No. 233,151**

**Int. Cl.**[3] **C08L** *13/00*

**U.S. Cl. 525—479** **14 Claims**

1. The process of the production of alkali metal silicate-organic plastic by mixing and reacting the following components:

(a) an aqueous alkali metal silicate solution in the amount of 100 parts by weight

(b) a polymerizable unsaturated organic compound in the amount of 5 to 100 parts by weight

(c) a mono or polycarboxylic acid salt forming compound in the amount of 1 to 10 parts by weight

(d) an initiator, a catalytic amount.

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4,303,769

## PROCESS FOR PREPARING SUBSTANTIALLY GEL-FREE CIS-1,4-POLYBUTADIENE

**Joseph Odar, South Euclid, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Continuation-in-part of Ser. No. 936,265, Aug. 22, 1978, abandoned. This application Aug. 8, 1980, Ser. No. 176,423**

**Int. Cl.**[3] **C08F** *4/70*

**U.S. Cl. 526—93** **13 Claims**

1. An improved process for the production of substantially gel-free cis-1,4-polybutadiene in the presence of a catalyst comprising a mixture of cobalt octoate or cobalt stearate and at least one aluminum compound selected from the group consisting of trialkyl aluminum, dialkyl aluminum chloride, alkyl aluminum dichloride and aluminum chloride or a mixture thereof, wherein said alkyls having 1 to 4 carbon atoms, the improvement comprising

(a) adding to the polymerization vessel butadiene, water, and a solution of the cobalt catalyst and then adding a solvent in which butadiene monomer and polymer are substantially soluble, provided that if the solvent is an aromatic or a chlorinated solvent at most 15 percent by weight based on the weight of total charge is added at this stage;

(b) after the mixture has become substantially homogeneous,

adding the entire amount of an aromatic or a chlorinated solvent, or the balance of such a solvent if part thereof was added earlier;

(c) thereafter adding at least one aluminum compound, said compound having a chlorine to aluminum ratio of between 0.7:1 and 1.6:1;

said polymerization system containing an aluminum to cobalt ratio between 40:1 and 300:1 and a water to aluminum ratio between 0.1:1 and 0.6:1; and finally

(d) polymerizing said butadiene-1,3 to a conversion of 30 to 90 percent producing gel-free cis-polybutadiene.

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## 4,303,770
## METHOD OF MAKING POLYMERS AND COPOLYMERS OF 1-OLEFINS

**Thomas J. Pullukat, Hoffman Estates, and Mitsuzo Shida, Barrington, both of Ill., assignors to Chemplex Company, Rolling Meadows, Ill.**

**Division of Ser. No. 87,702, Oct. 24, 1979, abandoned, which is a continuation-in-part of Ser. No. 916,807, Jun. 19, 1978, abandoned. This application Jul. 7, 1980, Ser. No. 166,109**
**Int. Cl.³ C08F *4/02, 4/24***
**U.S. Cl. 526—96** **11 Claims**

1. The method of making polymers of 1-olefins of 2–8 carbon atoms and copolymers of said olefins and 1-olefins of 2–20 carbon atoms which comprises polymerizing said olefins under polymerizing conditions with an improved catalyst prepared by the method comprising:

preparing (1) a mixture by dispersing on a finely divided, difficult to reduce, inorganic support of the class consisting of silica, alumina, thoria, zirconia, titania, magnesia and mixtures thereof a tetra or lower valent organic chromium compound capable of reacting with the support at an elevated temperature;

(2) calcining (1) in air or inert atmosphere and at an elevated temperature of 80°–260° C. for 15 minutes to 4 hours to bond said chromium compound on said support;

(3) reacting the product of (2) with an alkyl ester of titanium, boron, vanadium or mixtures thereof or boric acid at an elevated temperature; and

(4) immediately activating the product of (3), without reducing, with a dry gas that contains oxygen by heating at an elevated temperature said product of (3) in said gas.

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## 4,303,771
## PROCESS FOR THE PREPARATION OF HIGH DENSITY ETHYLENE POLYMERS IN FLUID BED REACTOR

**Burkhard E. Wagner, Highland Park; George L. Goeke, and Frederick J. Karol, both of Belle Mead, all of N.J., assignors to Union Carbide Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 969,275, Dec. 14, 1978, abandoned. This application Feb. 16, 1979, Ser. No. 12,712**
**Int. Cl.³ C08F *4/52***
**U.S. Cl. 526—125** **9 Claims**

1. A continuous catalytic process for producing ethylene homopolymers or copolymers containing ≧97 mol percent of ethylene and ≦3 mol percent of one or more $C_3$ to $C_8$ alpha olefins with a Ti containing catalyst at a productivity of ≧50,000 pounds of polymer per pound of Ti under a pressure of <1000 psi in a gas phase fluid bed reaction

said polymer being produced in granular form and having a density of about ≧0.94 to ≦0.97 and a melt flow ratio of about ≧22 or ≦32

which comprises polymerizing ethylene, or copolymerizing ethylene with at least one $C_3$ to $C_8$ alpha olefin, at a temperature of about 30° to 115° C. by contacting the monomer charge in the gas phase reaction zone, with particles of a non-comminuted catalyst system, comprising a precursor composition impregnated in an inert porous support and when so impregnated having the formula

$$Mg_mTi_1(OR)_nX_p[ED]_q$$

wherein R is a $C_1$ to $C_{14}$ aliphatic or aromatic hydrocarbon radical, or COR′ wherein R′ is a $C_1$ to $C_{14}$ aliphatic or aromatic hydrocarbon radical,

X is selected from the group consisting of Cl, Br, I, or mixtures thereof,

ED is an electron donor compound,

m is ≧0.5 to ≦56,

n is 0, 1 or 2,

p is ≧2 to ≦116 and

q is >1.5 m+2

ED is a liquid organic electron donor compound in which said precursor composition and the Ti and Mg component thereof are soluble and which is selected from the group consisting of alkyl esters of aliphatic and aromatic carboxylic acids, aliphatic ethers, cyclic ethers and aliphatic ketones, said impregnated precursor composition being partially activated with >0 to ≦10 mols of activator compound per mol of Ti in said impregnated precursor composition, and completing the activation of the partially activated precursor composition in said reaction zone with >10 to ≦400 mols of activator compound per mol of Ti in said precursor composition,

said activator compound having the formula

$$Al(R'')_cX'_dH_e$$

wherein X′ is Cl or OR‴, R″ and R‴ are the same or different, and are $C_1$ to $C_{14}$ saturated hydrocarbon radicals, d is 0 to 1.5, e is 1 or 0 and c+d+e=3.

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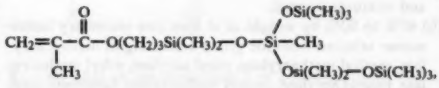
## 4,303,772
## OXYGEN PERMEABLE HARD AND SEMI-HARD CONTACT LENS COMPOSITIONS METHODS AND ARTICLES OF MANUFACTURE

**Nick N. Novicky, Buffalo Grove, Ill., assignor to George F. Tsuetaki, Chicago, Ill.**

**Filed Sep. 4, 1979, Ser. No. 72,449**
**Int. Cl.³ C08F *220/26;* G02C *7/04***
**U.S. Cl. 526—279** **4 Claims**

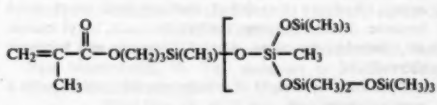
1. An oxygen permeable, hard or semi-hard, machinable, dimensionally stable, wettable, contact lens material of high transparency consisting essentially of a polymer formed by free radical polymerization of

(a) 10% to 60% by weight of at least one silicon-containing monomer selected from the class consisting of nonamethyltetrasiloxanylmethacryloxypropyldimethylsilane having the following formula:



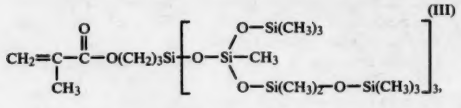
(I)

bis(nonamethyltetrasiloxanyl)methacryloxypropylmethylsilane having the following formula:



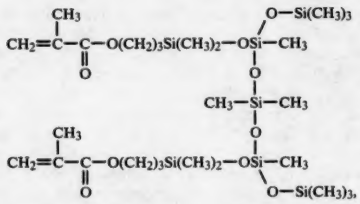
(II)

tris(nonamethyltetrasiloxanyl)methacryloxypropylsilane having the following formula:



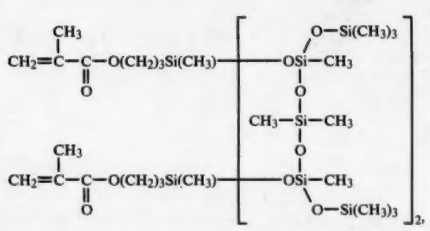
(III)

decamethylpentasiloxanyl-di(methacryloxypropyldimethylsilane) having the following formula:



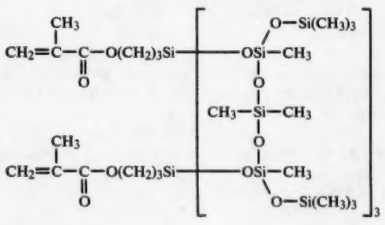
(IV)

bis(decamethylpentasiloxanyl)di(methacryloxypropylmethylsilane) having the following formula:



(V)

tris(decamethylpentasiloxanyl)di(methacryloxypropylsilane) having the following formula:



(VI)

and mixtures thereof,

(b) 40% to 90% by weight of at least one secondary comonomer selected from the group consisting of methyl acrylate, methyl methacrylate, ethyl acrylate, ethyl methacrylate, propyl acrylate, propyl methacrylate, isopropyl acrylate, isopropyl methacrylate, 2-ethylhexyl acrylate, 2-ethylhexyl methacrylate, cyclohexyl acrylate, cyclohexyl methacrylate, benzyl acrylate, benzyl methacrylate, phenyl acrylate, phenyl methacrylate, N-vinyl pyrrolidinone, 3-hydroxy 2-naphthyl methacrylate, ethyl vinyl benzene, divinyl benzene, methyl itaconate, butyl itaconate, dimethyl itaconate, dibutyl itaconate and mixtures thereof,

(c) 0% to 20% by weight of a monomer adapted to actas a wetting agent, and

(d) from about 0% to 10% by weight of at least one crosslinking monomer,

said weight percents of (a), (b), (c) and (d) being based on the total weight of the entire composition.

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**4,303,773**

## PROCESS FOR THE PRODUCTION OF POLYURETHANE UREA ELASTOMERS

**Otto Ganster; Hans J. Meiners, both of Leverkusen; Willi Eifler, Bergisch Gladbach; Holger Meyborg, Odenthal, and Jürgen Schwindt, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany**

**Filed May 9, 1980, Ser. No. 148,109**

**Claims priority, application Fed. Rep. of Germany, May 21, 1979, 2920501**

**Int. Cl.³ C08G** *18/32, 18/24, 18/16*

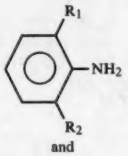
**U.S. Cl. 528—64** **12 Claims**

1. A process for the production of non-cellular polyurethane urea elastomers comprising reacting:

(a) polyisocyanates,

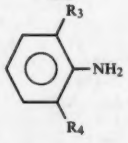
(b) compounds containing at least two isocyanate-reactive hydrogen atoms and having a molecular weight in the range of from 400 to 15,000, and

(c) alkyl-substituted diaminodiphenyl methanes, characterized in that component (c) is prepared by condensing formaldehyde with alkyl-substituted anilines corresponding to the formulae:



(A)

and



(B)

with a molar ratio of A to B of from 1:4 to 4:1, wherein

$R_1$, and $R_3$ which may be the same or different, represent hydrogen or an alkyl group containing 1 to 4 carbon atoms, and

$R_2$ and $R_4$ which may be the same or different represent an alkyl radical containing from 1 to 4 carbon atoms

and wherein A and B are not the same.

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**4,303,774**

## POLYURETHANES WHICH ARE DISPERSIBLE OR SOLUBLE IN WATER AND A PROCESS FOR THEIR PREPARATION

**Klaus Nachtkamp, Bergisch Gladbach; Josef Pedain, and Klaus Noll, both of Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Apr. 16, 1979, Ser. No. 30,600**

**Claims priority, application Fed. Rep. of Germany, Apr. 18, 1978, 2816815**

**Int. Cl.³ C08G** *18/64, 18/71, 18/50;* **C08L** *75/08*

**U.S. Cl. 528—71** **9 Claims**

1. Polyurethane elastomers which are soluble or dispersible in water and have a substantially linear molecular structure and contain both ethylene oxide units built into polyether chains and sulphonate groups, characterized in that they contain from about 0.5–20% by weight of ethylene oxide units of the formula $—CH_2—CH_2—O—$ arranged within polyether chains and from about 0.1–25 milliequivalents per 100 g of solids

content of sulphonate groups of the formula $—SO_3^{\ominus}$ in the form of structural units corresponding to the following formula arranged in end positions and/or side chains:

—O—X—R

wherein

X represents a polyalkylene oxide chain having from 5–90 chain members, at least about 40% of which chain members are ethylene oxide units, and

R represents a monovalent hydrocarbon group having from 3–18 carbon atoms and containing at least one sulphonate group $—SO_3^{\ominus}$.

**6**. A process for the preparation of a water-dispersible or water-soluble polyurethane comprising reacting

(a) an organic diisocyanate having a molecular weight between about 112 and 1000,

(b) an organic compound having a molecular weight of between about 60 and 6000 and having at least two isocyanate-reactive end groups, and

(c) a hydrophilic compound responsible for the dispersibility or solubility of the resulting polyurethane comprising a member selected from the group consisting of monoisocyanates, diisocyanates, compounds having at least one isocyanate-reactive group and compounds having at least two isocyanate-reactive groups, said hydrophilic compound having structural units of the formula

—O—X—R

wherein

X represents a polyalkylene oxide chain having from 5 to 90 chain members, at least about 40% of which are ethylene oxide units, and

R represents a monovalent hydrocarbon group having from 3 to 18 carbon atoms and containing at least one sulphonate $—SO_3^{\ominus}$ group

which are present in a sufficient quantity to contribute to the resulting polyurethane about 0.5 to 20% by weight of ethylene oxide units, based on the weight of the resulting polyurethane, and about 0.1 to 25 milliequivalents of sulfonate ions per 100 g of resulting polyurethane, said hydrophilic groups being attached to the resulting polyurethane in end positions or side chains.

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**4,303,775**

## NOVEL ACETYLENE END-CAPPED ESTERIMIDES

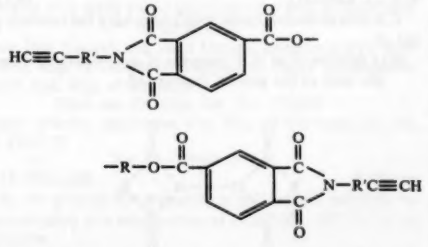
**Wai Y. Chow, and S. Paul Thackaberry, both of Houston, Tex., assignors to Gulf Oil Corporation, Pittsburgh, Pa.**

**Filed Sep. 6, 1979, Ser. No. 72,948**

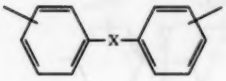
**Int. Cl.**[3] **C08G** *69/44*

**U.S. Cl. 528—170** **15 Claims**

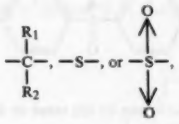
**1**. A heat-curable acetylene end-capped esterimide having the structure:



where R is an arylene group or a group having the structure:



where X is



$R_1$ is an alkyl group containing 1 or 2 carbon atoms and $R_2$ is hydrogen or an alkyl group containing 1 or 2 carbon atoms; and where R′ is a phenylene group.

**12**. A process for preparing a heat-curable acetylene end-capped esterimide of claim **1**, which consists essentially of:

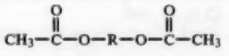
(a) heating a mixture of about 1 mol of a diacetate of a diphenol with about 2 mols of trimellitic anhydride and distilling about 2 mols of acetic acid therefrom,

(b) reacting about 2 mols of an aminophenyl acetylene with the reaction product of step (a) in a solvent at a temperature above about 50° C. to form an amic acid reaction product,

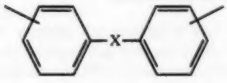
(c) adding to the reaction product of step (b) a solvent which forms an azeotrope with water, and

(d) heating the reaction mixture of step (c) to distill about 2 mols of water from the reaction mixture and convert the amic acid groups to imide groups;

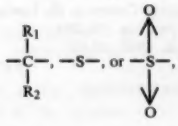
the diphenol diacetate employed having the structure:



where R is an arylene group or a group having the structure:



where X is



$R_1$ is an alkyl group containing 1 or 2 carbon atoms and $R_2$ is hydrogen or an alkyl group containing 1 or 2 carbon atoms.

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**4,303,776**

## BIS(4-HYDROXYPHENYL SULFONYLPHENYL) BISPHENYL DISULFONES AND USEFUL RESINS BASED THEREON

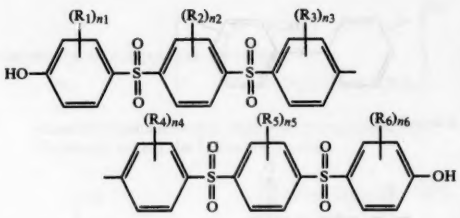
**Arthur L. Baron, and Parameswar Sivaramakrishnan, both of New Martinsville, W. Va., assignors to Mobay Chemical Corporation, Pittsburgh, Pa.**

**Filed Sep. 18, 1978, Ser. No. 943,515**

**Int. Cl.**[3] **C07C** *147/10*; **C08G** *75/20*

**U.S. Cl. 528—171** **16 Claims**

**1**. A monomer of the structural formula:

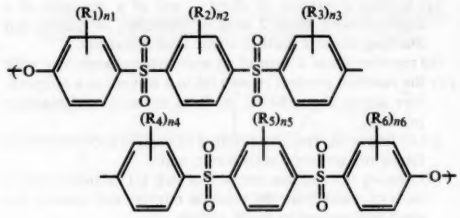


wherein

$R_1$, $R_2$, $R_3$, $R_4$, $R_5$ and $R_6$, which may be the same or different, are $C_1$–$C_4$-alkyl, Cl or Br, and

$n_1$, $n_2$, $n_3$, $n_4$, $n_5$ and $n_6$, which may be the same or different, are 0, 1 or 2.

5. A polyurethane comprising structural units of the formula:



wherein

$R_1$, $R_2$, $R_3$, $R_4$, $R_5$ and $R_6$, which may be the same or different, are $C_1$–$C_4$-alkyl, Cl or Br, and

$n_1$, $n_2$, $n_3$, $n_4$, $n_5$ and $n_6$, which may be the same or different, are 0, 1 or 2.

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**4,303,777**

## ACETAL CARBOXYLIC ACID POLYMERS

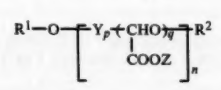
**Marvin M. Crutchfield, and David R. Dyroff, both of Creve Coeur, Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Jun. 5, 1980, Ser. No. 156,704**

**Int. Cl.**[3] **C08G** *6/00;* **C08L** *61/02*

**U.S. Cl. 525—398** **9 Claims**

1. A polymer having the average structure:



wherein Y is a moiety derived from a comonomer containing 1 to about 20 carbon atoms randomly distributed along the polymer chain, the comonomer being selected from the group consisting of aldehydes and epoxy compounds; p is 0 or 1; the product of q and n averages at least 4; $R^1$ and $R_2$ are individually any chemically stable group which stabilizes the polymer against rapid depolymerization in alkaline solution; and Z is a mixture of H and members selected from the group consisting of alkali metals, ammonium and alkanol amine groups having from 1 to about 4 carbon atoms.

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**4,303,778**

## METHOD OF ANIONIC POLYMERIZATION OF ω-AMINOACID LACTAMS WITH ALKALI METAL-AL,B-ALKOXY LACTAMATE INITIATOR

**Jaroslav Kralicek, Prague; Vladimir Kubanek, Kralupy; Jiri Marik; Jaroslava Kondelikova, both of Prague; Jiri Machacek, Kralupy, and Bohuslav Casensky, Prague, all of Czechoslovakia, assignors to Vysoka skola chemicko-technologicka, Prague, Czechoslovakia**

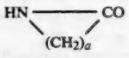
**Division of Ser. No. 749,239, Dec. 10, 1976, abandoned. This application Jan. 17, 1978, Ser. No. 870,078**

**Claims priority, application Czechoslovakia, Dec. 10, 1975, 8392/75; Dec. 10, 1975, 8397/75**

**Int. Cl.**[3] **C08G** *69/20*

**U.S. Cl. 528—312** **2 Claims**

1. A method for the anionic polymerization of at least one ω-aminoacid lactam of the formula



wherein a is an integer ranging from 3 to 11 which comprises effecting polymerization at elevated temperatures in the presence of an initiator for the anionic polymerization of lactams, said initiator having the formula

$$MeZX_mL_n$$

wherein Me is an alkali metal selected from the group consisting of lithium, sodium and potassium, Z is selected from the group consisting of aluminum and boron, X is an alkoxy group of 3 to 6 carbon atoms and L is an organic residue derived from lactam of the formula

wherein a is an integer from 3 to 11, m is an integer selected from 0, 1 and 3, the sum of m+n is 4, or n is (4-m) and an activator for the anionic polymerization of lactam, so resulting in a solid crystalline lactam polymer.

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**4,303,779**

## THERMOSETTING IMIDE RESINS FROM DIHYDRAZIDE

**Horst Stenzenberger, Schriesheim, Fed. Rep. of Germany, assignor to Technochemie GmbH-Verfahrenstechnik, Dossenheim, Fed. Rep. of Germany**

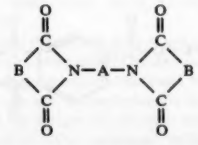
**Filed Nov. 27, 1979, Ser. No. 97,657**

**Int. Cl.**[3] **C08G** *73/12*

**U.S. Cl. 528—312** **17 Claims**

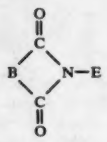
1. A thermosetting imide resin comprising the reaction product of

(a) a mixture of an N,N'-bisimide of an unsaturated dicarboxylic acid of the general formula of

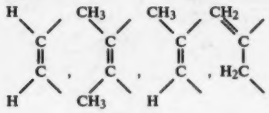


(I)

and a monoimide of the general formula (II)

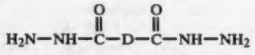


wherein the residue A signifies a divalent organic group with at least two carbon atoms, E is selected from the group consisting of alkyl, cycloalkyl, and aryl groups and B a divalent organic group of the formulas indicated hereinbelow



with

(b) the dihydrazide of an organic dicarboxylic acid of the general formula (III)



wherein D represents a divalent organic group, the molar proportion of the reaction between the unsaturated imide groups contained in the mixture and the hydrazide groups contained in the mixture

$$\frac{\text{Number of moles of unsaturated imide}}{\text{Number of moles of acid hydrazide}}$$

being between 1.1 and 100.

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**4,303,780**

**UREYLENES AND USES THEREOF**

**Thomas J. Bellos, Kirkwood, Mo., assignor to Petrolite Corporation, St. Louis, Mo.**

**Filed Feb. 26, 1980, Ser. No. 124,998**

**Int. Cl.³ C08G *71/02***

**U.S. Cl. 528—367** **11 Claims**

1. A ureylene derived from first reacting a polyamine with about 0.5 to 0.8 mole of an oxyalkylating agent per NH equivalents of said polyamine, and thereafter reacting said oxyalkylated polyamine with urea.

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**4,303,781**

**PROCESS FOR THE PREPARATION OF POLYARYLENE SULPHIDES**

**Karsten Idel, Krefeld, and Josef Merten, Korschenbroich, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jul. 23, 1980, Ser. No. 171,304**

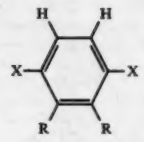
**Claims priority, application Fed. Rep. of Germany, Jul. 28, 1979, 2930710**

**Int. Cl.³ C08G *75/14***

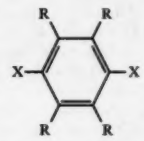
**U.S. Cl. 528—388** **8 Claims**

1. In the process for preparing a polyarylene sulphide by polycondensing at a temperature of from 160°–285° C. for up to 60 hours

(a) a p-dihalogenobenzene which consists of 50–100 mol % of a compound of the formula



and 0–50 mol % of a compound of the formula



wherein X is fluorine, chlorine, bromine or iodine and each R is independently selected from the group consisting of hydrogen, $C_1$–$C_{20}$-alkyl, $C_5$–$C_{20}$-cycloalkyl, $C_6$–$C_{24}$-aryl, $C_7$–$C_{24}$-alkaryl and $C_7$–$C_{24}$-aralkyl with the proviso that at least one R is other than hydrogen; and

(b) 0–2.0 mol %, based on (a), of a compound of the formula $ArX_n$ wherein Ar is an aromatic radical having 6 to 24 carbon atoms and at least 3 free valencies, X is as aforesaid and n is at least 3 with

(c) an alkali metal sulphide in

(d) a polar solvent, the molar ratio of (a) to (c) being from 0.98:1 to 1.02:1 and the molar ratio of (c) to (d) being from 1:2 to 1:10, the improvement wherein said polycondensation is carried out in the presence of 0.05–2.0 mols of tri-alkali metal phosphate per mol of (c).

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**4,303,782**

**POLYMERIZATION OF CYCLIC ETHERS**

**William D. McHale, Mantua, and Joseph G. Bendoraitis, Pitman, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Jan. 21, 1980, Ser. No. 113,900**

**Int. Cl.³ C08G *65/20***

**U.S. Cl. 528—416** **7 Claims**

1. A method for making a high molecular weight, solid polymer, comprising polymerizing a tetrahydrofuran in the presence of crystalline aluminosilicate zeolite catalyst having a Constraint Index from 1 to 12 and a silica:alumina ratio of at least 12.

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**4,303,783**

**PRODUCTION OF REFLECTOR BEADS FROM PRECURSOR BEADS FOR EXPANDABLE POLYSTYRENE**

**Ronald A. Fava, Monroeville, and Clarence E. Chaney, Verona, both of Pa., assignors to ARCO Polymers, Inc., Philadelphia, Pa.**

**Filed May 5, 1980, Ser. No. 146,923**

**The portion of the term of this patent subsequent to Dec. 1, 1998, has been disclaimed.**

**Int. Cl.³ C08F *6/24***

**U.S. Cl. 528—488** **3 Claims**

1. The method for production of reflector beads from precursor polystyrene beads which includes the steps: of preparing an aqueous solution having an inorganic solute having a concentration within the range from about 1.5 about 6 molar; preparing a dispersion of precursor polystyrene beads in said solution: maintaining said dispersion at a temperature within the range from about 110° to about 130° C. for a period from about 2 to about 20 minutes; thereafter water rinsing and drying the beads to provide crystal clear reflector beads.

4,303,784

## PRODUCTION OF POLYSTYRENE REFLECTOR BEADS

Ronald A. Fava, Monroeville, and Clarence E. Chaney, Verona, both of Pa., assignors to ARCO Polymers, Inc., Philadelphia, Pa.

Filed May 5, 1980, Ser. No. 146,924
The portion of the term of this patent subsequent to Dec. 1, 1998, has been disclaimed.
Int. Cl.[3] C08F 6/24
U.S. Cl. 528—488 1 Claim

1. The method for production of reflector polystyrene beads from monomeric styrene which includes the steps of: preparing an aqueous dispersion of monomeric styrene, a polymerization catalyst, and submicron particles of an insoluble inorganic nucleating component; polymerizing the styrene to a dispersion of polystyrene beads by maintaining and agitating said dispersion at an elevated temperature for a period from about 2 to 20 hours; said polymerizing including a terminal treatment at a temperature within the range from about 110° C. to about 140° C. for from about 1 to about 2 hours while said aqueous dispersion contains an inorganic solute having a concentration within the range from about 2.5 to about 6 molar.

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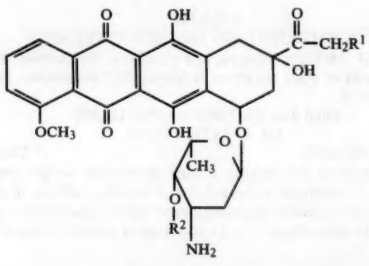
4,303,785

## ANTITUMOR ANTHRACYCLINE ANTIBIOTICS

Hamao Umezawa; Tomio Takeuchi; Hiroshi Naganawa, and Kuniaki Tatsuta, all of Tokyo, Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

Continuation-in-part of Ser. No. 928,627, Jul. 27, 1978, abandoned. This application Jan. 31, 1980, Ser. No. 117,163
Claims priority, application Japan, Aug. 5, 1978, 53-94348; Feb. 3, 1979, 54-11702; Aug. 31, 1979, 54-110255
Int. Cl.[3] C07H 15/24; A61K 31/71
U.S. Cl. 536—17 A 60 Claims

1. An anthracycline glycoside of the formula



I

wherein $R^1$ represents hydrogen, hydroxyl, tetrahydropyranyloxy, $C_2$–$C_7$ alkanoyloxy or phenylacetyloxy and $R^2$ represents hydrogen, $C_1$–$C_8$ alkyloxyethyl, cyclohexyloxyethyl, tetrahydrofuranyl, tetrahydropyranyl, 6-methoxytetrahydropyranyl, 6-carbomethoxytetrahydropyranyl or 6-acetoxymethyltetrahydropyranyl, with the provisos that (1) when $R^1$ is hydrogen or hydroxyl, $R^2$ is not hydrogen and (2) when $R^1$ is tetrahydropyranyloxy, $R^2$ is hydrogen or tetrahydropyranyl, or a nontoxic acid addition salt thereof.

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4,303,786

## ISONITRILE DERIVATIVES OF MACROMOLECULES CONTAINING HYDROXYL GROUPS

Leon Goldstein, Rehovot; Amihay Freeman, Rishon Lezion, and Mordechai Sokolovsky, Tel-Aviv, all of Israel, assignors to Ramot - Tel-Aviv University, Tel-Aviv, Israel

Filed Jul. 31, 1978, Ser. No. 929,229
Claims priority, application Israel, Aug. 4, 1977, 52652
Int. Cl.[3] C08B 37/02, 11/155, 31/08
U.S. Cl. 536—51 11 Claims

1. An isocyano derivative of a linear or cross-linked polymer bearing a plurality of hydroxyl groups, said derivative having the general formula

P—O—Q—N≡C

wherein P designates a polymeric backbone selected from the group consisting of cellulose, starch, linear dextran, cross-linked dextran, linear agarose, cross-linked agarose, polyvinyl alcohol and N-2-hydroxyethyl derivatives of a polyacrylamide, the oxygen atom is part of the hydroxy group, Q is a group $-(CH_2)_n-$ wherein n is an integer of 3 to 20, said isocyano derivative containing from 9 to 100 micro-moles ($\mu$-mole) isonitrile groups per gram of said isocyano derivative.

4. An isocyano substituted polymer according to claim 1, wherein the polymeric backbone is dextran or agarose.

5. An isocyano substituted polymer according to claim 4, wherein the polymeric backbone is dextran.

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4,303,787

## PROCESS FOR RECOVERING CYCLODEXTRINS

Koki Horikoshi, Tokyo; Mikio Yamamoto, Asaka; Nobuyuki Nakamura, Kunitachi, and Masanobu Kawano, Sendai, all of Japan, assignors to Rikagaku Kenkyusho, Wako and Nihon Shokuhini Kako Co., Ltd., Marunouchi, both of, Japan

Filed May 23, 1980, Ser. No. 152,673
Claims priority, application Japan, Jun. 1, 1979, 54/68589
Int. Cl.[3] C08B 37/16
U.S. Cl. 536—103 8 Claims

1. A process for recovering cyclodextrins wherein a solution containing cyclodextrins as well as starches, dextrins, reducing sugars is brought into contact with a hydrophobic, synthetic adsorption resin comprising a porous polymer to absorb only cyclodextrins, said polymer having no functional radical and having pores into which liquid water cannot enter, after which said adsorbed cyclodextrins are eluted.

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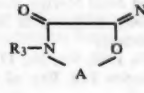
4,303,788

## 2-OXIMINO-TETRAHYDRO-1,4-OXAZIN-3-ONES

John A. Durden, Jr., South Charleston, and Arthur P. Kurtz, Jr., Charleston, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 698,029, Jun. 21, 1976, Pat. No. 4,235,902. This application May 9, 1980, Ser. No. 148,511
Int. Cl.[3] A01N 43/84; C07D 265/32; A01N 43/78
U.S. Cl. 544—164 6 Claims

1. A compound of the formula:



wherein:

Z is hydrogen;

$R_3$ is hydrogen, alkyl, cycloalkyl, alkoxyalkyl or phenyl;

A is ethylene either unsubstituted or substituted with one or more alkyl;

wherein the alkoxyalkyl, alkyl or cycloalkyl moieties individually may not contain more than 6 carbons.

4,303,789

## 2-AMINO-4-(SUBSTITUTED HYDRAZINO)-6-IMINO PYRIMIDINES

Robert W. Morrison, Jr.; William R. Mallory, and Virgil L. Styles, all of Raleigh, N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

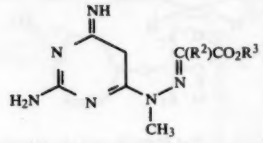
Division of Ser. No. 922,545, Jul. 7, 1978, Pat. No. 4,225,710. This application May 27, 1980, Ser. No. 153,061

Claims priority, application United Kingdom, Jul. 8, 1977, 28765/77

Int. Cl.[3] C07D *239/50*

U.S. Cl. 544—323 1 Claim

1. A compound of the formula (VII):



(VIII)

wherein $R^2$ is lower alkyl, lower acyloxymethyl, phenyl, benzyl, benzyl substituted in the phenyl ring with one or more nitro or lower alkoxy, phenacyl, phenacyl substituted in the phenyl ring with one or more hydroxy or lower alkoxy, $CH_2OCOR^4$ where $R^4$ is lower alkyl, indolyl, indolymethyl, $CH(CN)CH_2C_6H_5$, $CH(CN)CH_2C_6H_5$ substituted in the phenyl ring with one or more more lower alkoxy, $CH(Y)$-$CO_2Z$ or $CH_2CH_2CO_2Z$ in which Y is a hydrogen atom or lower alkly and Z is hydrogen or $C_{1-4}$ alkyl, and $R^3$ is lower alkyl.

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4,303,790

## 2-AMINO-4-IMINO-6-HYDRAZINOPYRIMIDINE

Robert W. Morrison, Jr.; William R. Mallory, and Virgil L. Styles, all of Raleigh, N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

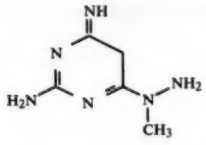
Division of Ser. No. 922,545, Jul. 7, 1978, Pat. No. 4,225,710. This application May 27, 1980, Ser. No. 153,060

Claims priority, application United Kingdom, Jul. 8, 1977, 28765/77

Int. Cl.[3] A61K *31/505;* C07D *239/50*

U.S. Cl. 544—323 1 Claim

1. A compound of the formula (VIII):



(VIII)

tautomers thereof and salts thereof.

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4,303,791

## 1-METHYL OR PROPYL ORGANIC NITROGEN COMPOUNDS AND METHOD OF PREPARATION

Costandi A. Audeh, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 10, 1979, Ser. No. 73,766

Int. Cl.[3] C07D *487/08*

U.S. Cl. 544—351 1 Claim

1. As a composition of matter 1-methyl or propyl, 4-aza, 1-azonia-bicyclo(2,2,2)octane, 4-oxide, halides.

4,303,792

## N-SUBSTITUTED HALOACYLOXYACETAMIDES HERBICIDAL ANTIDOTES

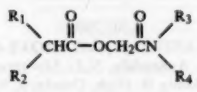
Hsaio-Ling Lam, Walnut Creek, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed May 24, 1979, Ser. No. 42,187

Int. Cl.[3] A01N *43/76, 37/18;* C07D *263/06;* C07C *69/63*

U.S. Cl. 548—215 6 Claims

1. N-substituted haloacyloxyacetamide compounds corresponding to th following formula



in which

$R_1$ is selected from the group consisting of chlorine and bromoethyl;

$R_2$ is selected from the group consisting of hydrogen, chlorine and bromine;

$R_3$ and $R_4$ together with the nitrogen atom to which they are attached form a 4–10 carbon alkyl substituted oxazolidine ring.

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4,303,793

## AQUEOUS CARBAMATE DISPERSIONS

Leo J. Paridon, Doylestown, and Robert E. Downing, Wadsworth, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 19,536, Mar. 12, 1979, abandoned, which is a continuation of Ser. No. 788,957, Apr. 19, 1977, abandoned. This application Sep. 22, 1980, Ser. No. 189,278

Int. Cl.[3] C07C *125/04, 125/06*

U.S. Cl. 560—24 3 Claims

1. A process for preparing a stable, flowable, aqueous dispersion of carbamate compound selected from isopropyl N-phenylcarbamate, isopropyl N-m-chlorophenyl carbamate, 4-chlorophenyl N-methyl carbamate, 4-chlorophenyl N,N-dimethyl carbamate or 2-chlorophenyl N-n-propyl carbamate by injecting molten carbamate into a stirred aqueous solution of inorganic alkali or alkaline earth metal salt, said salt solution having a specific gravity of from 90 to 110 percent of the specific gravity of the molten carbamate and being maintained at a temperature of from about 10° C. to about 50° C. below the temperature of the molten carbamate, the molten carbamate being injected into the salt solution at a rate such that the molten carbamate penetrates beneath the surface of the salt solution and forms therein a suspension of carbamate particles, at least 80 percent of said particles having a size in the range of 500 to 3500 microns and wet-milling and thus formed suspension to produce an aqueous carbamate dispersion containing from about 10 to about 70 weight percent carbamate wherein the size of the carbamate particles is less than 20 microns.

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4,303,794

## SEPARATION AND RECOVERY OF 4,4'-METHYLENE DIMETHYL DIPHENYLDICARBAMATE

Brian G. Pope, Baton Rouge, La., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 22, 1980, Ser. No. 219,146

Int. Cl.[3] C07C *125/073*

U.S. Cl. 560—25 17 Claims

1. A method for the separation of a reaction product, 4,4'-methylene dimethyl diphenyldicarbamate; a reactant, methyl phenylcarbamate; byproduct compounds, or reaction intermediates in the condensation reaction of methyl phenylcarbamate and formaldehyde; other methylene dialkyl diphenyldicarbamates, and other alkyl phenylcarbamates, comprising the steps of:

(a) washing a mixture, including the methyl phenylcarba-

mate reactant, byproduct compounds, reaction intermediates, other methylene dialkyl diphenyldicarbamates, or other alkyl phenylcarbamates, and the 4,4'-methylene dimethyl diphenyldicarbamate product, with an alcohol having less than four carbon atoms per molecule, thereby forming a liquid phase which includes the alcohol and the compounds in the mixture which are soluble in the alcohol, and a solid phase of substantially 4,4'-methylene dimethyl diphenyldicarbamate product; and

(b) separating the solid and liquid phases.

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**4,303,795**

**SUBSTITUTED β-ANILINO-γ-METHOXY-CROTONATES**

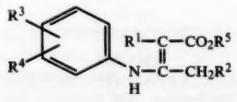
**Richard A. Conley, Annandale, N.J.; Margaret M. Lam, New York, N.Y., and Leroy B. High, Cranbury, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Division of Ser. No. 56,660, Jul. 11, 1979, Pat. No. 4,252,945. This application Jul. 23, 1980, Ser. No. 171,579**

**Int. Cl.³ C07C *101/453***

**U.S. Cl. 560—43** **3 Claims**

1. An intermediate of the structure



wherein

$R^1$ is hydrogen, lower alkyl, hydroxymethyl, phenyl-lower alkyl, phenyl or phenyl substituted with halogen, lower alkyl, lower alkoxy, or trifluoromethyl;

$R^2$ is lower alkoxy, phenyl-lower alkoxy, phenoxy, or phenoxy substituted with lower alkyl or lower alkoxy;

$R^3$ and $R^4$ are the same or different and are selected from the group consisting of hydrogen, alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons, lower alkanoyloxy of 1 to 4 carbons, nitro, benzyloxy, benzyloxy having a single mono-lower alkoxy substituent, halogen, hydroxy, and trifluoromethyl;

and $R^5$ is lower alkyl.

**4,303,796**

**16-PHENOXY PROSTAGLANDIN $F_{2\alpha}$ ANALOGS**

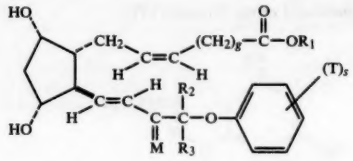
**Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 252,030, May 10, 1972. This application Dec. 19, 1973, Ser. No. 426,058**

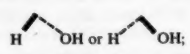
**Int. Cl.³ C07C *177/00***

**U.S. Cl. 560—60** **31 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein g is an integer from 2 to 5, inclusive; wherein M is

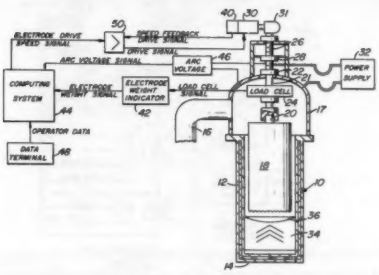


wherein $R_1$ is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein $R_2$ and $R_3$ are hydrogen, methyl, or ethyl; wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $—OR_4$ wherein $R_4$ is alkyl of one to 3 carbon atoms, inclusive, and wherein s is zero, one, 2, or 3, with the proviso that not more then two T's are other than alkyl; including each of the lower trialkanoates thereof, and each of the pharmacologically acceptable salts thereof when $R_1$ is hydrogen.

## 4,303,797
## METHOD AND APPARATUS FOR CONTROLLING ELECTRODE DRIVE SPEED IN A CONSUMABLE ELECTRODE FURNACE

**Raymond J. Roberts, W. Berlin, N.J., assignor to Consarc Corporation, Rancocas, N.J.**

**Filed Jun. 20, 1980, Ser. No. 161,461**
**Int. Cl.³ H05B 7/152**
**U.S. Cl. 13—13** **19 Claims**



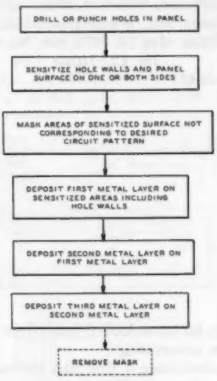

1. In a consumable electrode melting furnace comprising an electrode, a fluid cooled mold, an electrical supply system for melting said electrode to form an ingot in said mold, electrode drive means for repositioning said electrode as the melt proceeds, electrode weight sensing means for measuring the weight of said electrode or said ingot, the improvement comprising a control system for regulating the output speed of said electrode drive means at a speed computed from measured changes in the weight of said electrode or said ingot during the melt, the geometry of the electrode, the geometry of the mold, and the speed of movement of the bottom of the ingot of the electrode if other than zero; said speed being increased or decreased by a trim speed function determined from measurement of voltage or current or other electrical phenomenon which has a value related to the distance between the bottom surface of the electrode and the top surface of the ingot.

## 4,303,798
## HEAT SHOCK RESISTANT PRINTED CIRCUIT BOARD ASSEMBLIES

**Milan Paunovic, Port Washington, N.Y., assignor to Kollmorgen Technologies Corporation, Dallas, Tex.**

**Filed Apr. 27, 1979, Ser. No. 34,210**
**Int. Cl.³ H05K 1/09**
**U.S. Cl. 174—68.5** **9 Claims**

1. In a method of printed circuit board manufacture, the improvement for increasing the heat shock resistance of the through hole plating comprising using as said plating at least two layers of an internally stressed electrically conductive metal, each such layer having a thickness of from about 2.5 to about 35 microns, in combination with at least one intermediate layer of a different electrically conductive metal having an

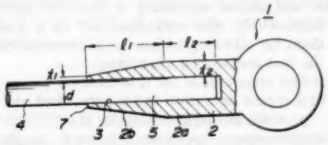

DRILL OR PUNCH HOLES IN PANEL
SENSITIZE HOLE WALLS AND PANEL SURFACE ON ONE OR BOTH SIDES
MASK AREAS OF SENSITIZED SURFACE NOT CORRESPONDING TO DESIRED CIRCUIT PATTERN
DEPOSIT FIRST METAL LAYER ON SENSITIZED AREAS INCLUDING HOLE WALLS
DEPOSIT SECOND METAL LAYER ON FIRST METAL LAYER
DEPOSIT THIRD METAL LAYER ON SECOND METAL LAYER
REMOVE MASK

internal stress in counteraction to that of said other metal layers.

## 4,303,799
## INSULATOR COMPRISING A HOLDING METAL FITTING AND A FIBER REINFORCED PLASTIC ROD HELD IN THE SLEEVE OF THE METAL FITTING UNDER PRESSURE

**Takeshi Ishihara, Toyoake, and Masaru Kojima, Nagoya, both of Japan, assignors to NGK Insulators Ltd., Nagaya, Japan**

**Filed Jan. 15, 1980, Ser. No. 112,324**
**Claims priority, application Japan, Jan. 20, 1979, 54-5450**
**Int. Cl.³ H01B 17/02, 17/40**
**U.S. Cl. 174—176** **4 Claims**



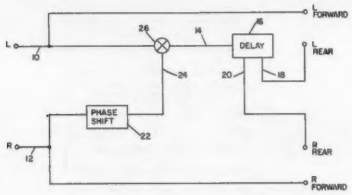

1. In an insulator comprising a fiber reinforced plastic rod having a substantially cylindrical outer surface and a holding metal fitting, said holding metal fitting including a sleeve having a cylindrical inner surface, said sleeve receiving an end of said rod and frictionally holding said rod by being compressed onto the rod, an improvement comprising said sleeve including a base portion having a large thickness and defining mainly the static load performance of the insulator and an inlet portion having a tapered thickness and defining mainly the vibration fatigue performance of the insulator, said inlet portion being formed at an extended portion of the base portion so as to form a unitary body having a seamless cylindrical bore together with the base portion and having a thickness gradually decreasing towards a tip for receiving the FRP rod and further satisfying the conditions that the relation between the thickness $t_1$ of the inlet portion and the diameter d of the rod is $t_1 \leqq d/5$, and the relation between the length $l_1$ of the inlet portion and the diameter d of the rod is $d \leqq l_1 \leqq 20d$; and the rod being frictionally held by the base portion and the inlet portion.

**4,303,800**

## REPRODUCING MULTICHANNEL SOUND

**Richard E. DeFreitas, Westford, Mass., assignor to Analog and Digital Systems, Inc., Wilmington, Mass.**

**Filed May 24, 1979, Ser. No. 41,984**
**Int. Cl.[3] H04R** *5/04*
**U.S. Cl. 179—1 G** **9 Claims**




1. Apparatus for reproducing sound from a plurality of audio input channels, comprising:

means for combining a first and second of said channels carrying a first signal and a second signal respectively such that signals common to the channels in a middle audio frequency range are attenuated, said means comprising

means for phase shifting said first signal and

means for summing said phase-shifted first signal with said second signal to produce an ambiance signal, and

means for delaying said ambiance signal and providing said signal as an output.

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**4,303,801**

## APPARATUS FOR MONITORING AND SIGNALLING SYSTEM

**Richard W. Anderson, Reading, and J. Edward Schlener, Winchester, both of Mass., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Nov. 14, 1979, Ser. No. 94,013**
**Int. Cl.[3] H04M** *11/04*
**U.S. Cl. 179—5 R** **13 Claims**

1. In a monitoring and signalling system, apparatus comprising:

first and second apparatus at first and second locations, respectively, and interconnected by a transmission medium for allowing bidirectional communication between the first and second apparatus;

said first apparatus at the first location comprising:

first means operative under prescribed circumstances to produce an alarm condition;

second means operative following an alarm condition produced by the first means to produce a first sensible alarm indication for a predetermined first interval of time;

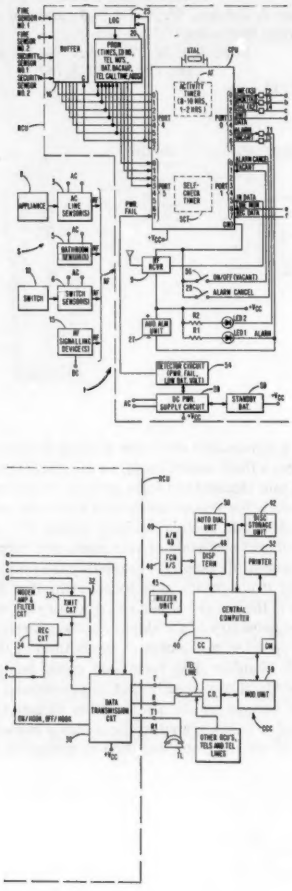
third means operative following the predetermined first interval of time to initiate communication with the second apparatus at the second location over the transmission medium;

fourth means operative for the duration that the third means communicates with the second apparatus to produce a second sensible alarm indication distinguishable from the first sensible alarm indication and indicating that the third means is communicating with the second apparatus; and

fifth means operative at the conclusion of the communication with the second apparatus to terminate the second sensible alarm indication produced by the fourth means thereby to provide a period of silence following the second sensible alarm indication indicating that the communication was received by the second apparatus; and

said second apparatus at the second location comprising:

sixth means operative under operator control to communicate with the first apparatus over the transmission medium to provide an additional sensible indication at the first apparatus following the period of silence for indicating that the communication to the second apparatus was received by the second apparatus.



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**4,303,802**

## MONITORING SYSTEM USING TELEPHONE CIRCUIT

**Edward H. Cumpston, Bennington, Vt., assignor to Venmark Corporation, Bennington, Vt.**

**Continuation-in-part of Ser. No. 45,138, Jun. 4, 1979, abandoned. This application Aug. 19, 1980, Ser. No. 179,297**
**Int. Cl.[3] H04M** *11/04*
**U.S. Cl. 179—2 A** **9 Claims**

1. A monitor system comprising:

a. an electric switch that changes state in response to change in a monitored condition;

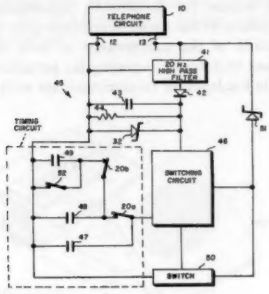
b. a monitor circuit containing said switch and connected to a telephone circuit;

c. means for effectively isolating said monitor circuit from said telephone circuit so said monitor circuit does not interfere with use of said telephone circuit;

d. means for energizing said monitor circuit by a small portion of an ac ringing signal in said telephone circuit;

e. said monitor circuit being arranged for interrupting ring-

ing of said telephone circuit by briefly interacting with said telephone circuit to electrically simulate answering said telephone circuit; and




f. said interrupting of said ringing of said telephone circuit being arranged to occur after a ringing interval as a function of the state of said switch when said telephone circuit is rung so that the number of rings before interruption conveys information about said monitored condition.

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**4,303,803**

## DIGITAL SPEECH INTERPOLATION SYSTEM

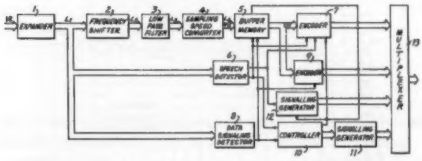
**Yohtaro Yatsuzuka, Yokohama, Japan, assignor to Kokusai Denshin Denwa Co., Ltd., Tokyo, Japan**

**Filed Aug. 30, 1979, Ser. No. 71,255**

**Claims priority, application Japan, Aug. 31, 1978, 53-105611; Sep. 4, 1978, 53-108346**

**Int. Cl.³ H04J** *6/02*

**U.S. Cl. 177—15.55 R** **2 Claims**




1. A digital speech interpolation system wherein digital input signals are divided into blocks which are a group of a predetermined number of serial samples and a frequency range of which is a voice band itself, and only the unit block in which speech exists is transmitted after predictive coding, comprising: a variable bit quantizer for carrying out said predictive coding, means for determining the nature of the speech in the unit block in which speech exists, means for estimating occurrence of freeze-out above a predetermined amount in speech interpolation, and means for reducing the number of quantizing bits in predictive coding in the order of the unit block which is expected to have a better signal-to-quantization noise ratio in predictive coding, and for suppressing freeze-out less than said predetermined amount in such unit.

**4,303,804**

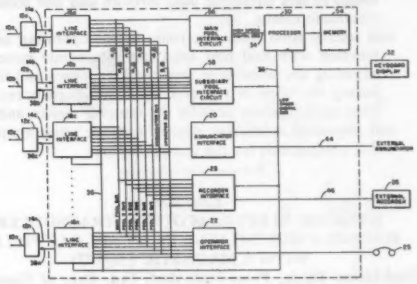
## TELEPHONE-CONFERENCING APPARATUS AND METHOD HAVING LINE LOCATION

**Avery R. Johnson, Milford, and John M. Harrison, Epsom, both of N.H., assignors to Small World Exchange, Inc., Nashua, N.H.**

**Filed Mar. 23, 1979, Ser. No. 23,381**

**Int. Cl.³ H04M** *1/22, 3/22, 3/56*

**U.S. Cl. 179—18 BC** **10 Claims**




1. Telephone conferencing apparatus comprising

input means for concurrently receiving a plurality of incoming calls over an associated plurality of incoming telephone lines and including means for responding to a caller-initiated signaling condition on any incoming line for conditioning that line for conference communication,

control means responsive to said input means for connecting said lines associated with said incoming calls to at least one conference grouping wherein any associated incoming line in the grouping provides communication with other lines in said grouping and wherein said grouping has the capacity of at least three incoming calls, said control means providing said connecting of each line to such a conference grouping independently of the connecting of other of said lines to a conference grouping, and

monitor means operatively responsive to the incoming signal energy on each incoming line for generating electrical report signals distinct from incoming communication and indicating at least which of said lines carries incoming communication.

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**4,303,805**

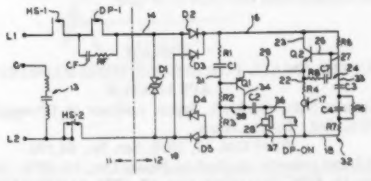
## SUBSCRIBER STATION NETWORK

**Jan Synek, Chicago, Ill., and Michael Tentler, Kenosha, Wis., assignors to United Networks, Inc., Chicago, Ill. and Manu-Tronics, Inc., Kenosha, Wis.**

**Filed May 21, 1979, Ser. No. 41,004**

**Int. Cl.³ H04M** *1/58*

**U.S. Cl. 179—81 R** **13 Claims**




1. An improved telephone subscriber station network,

said network comprising telephone lines for connecting the subscriber station to other subscriber stations,

said telephone lines comprising at least two lines having a D.C. potential therebetween,

receiver means for receiving communication signals from said lines,

transmitter means for transmitting communication signals over said lines,

first solid state electronic means coupling said transmitter means and said receiver means to said telephone lines while automatically compensating for losses on said telephone lines,

second solid state electronic means coupling said receiver means to said telephone lines through said first solid state electronic means,

said second solid state electronic means operating in conjunction with said first solid state electronic means for adjusting the sidetone in said receiver means and for adjusting the level of the communication signals received from the telephone lines by the receiver means, and

said improved subscriber station network using noninductive components for the compensation.

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**4,303,806**

## DYNAMIC ELECTROACOUSTIC TRANSDUCER HAVING A MOVING COIL IN AN AIR GAP FILLED WITH A MAGNETIC LIQUID

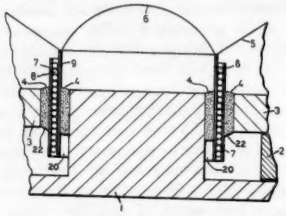
**Karl-Heinz Thiele, Peine-Stederdorf, Fed. Rep. of Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Fed. Rep. of Germany**

**Continuation of Ser. No. 940,183, Sep. 7, 1978, abandoned. This application Dec. 28, 1979, Ser. No. 107,783**

**Claims priority, application Fed. Rep. of Germany, Sep. 9, 1977, 2740661**

**Int. Cl.³ H04R** *9/06*

**U.S. Cl. 179—115.5 VC** **10 Claims**



1. A dynamic electroacoustic transducer, comprising a pole core base, a pole plate spaced from said base and defining an air gap therebetween, a moving coil disposed around said pole core base and being movable in the air gap, said coil extending beyond each end of said air gap, a magnetic liquid in said gap at least at the side of said coil remote from said pole core base, and smooth continuous surface means on said coil in contact with said magnetic liquid for separating said moving coil from contact with said magnetic liquid in said gap, said smooth continuous surface means being disposed intermediate said moving coil and said magnetic liquid on the side of said moving coil remote from said pole core base.

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**4,303,807**

## ULTRA-SMALL PORTABLE SOUND REPRODUCING APPARATUS

**Masaaki Sato, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Oct. 12, 1979, Ser. No. 84,190**

**Claims priority, application Japan, Oct. 18, 1978, 53/128218; Oct. 18, 1978, 53/128219; Oct. 18, 1978, 53/143051[U]**

**Int. Cl.³ H04R** *1/02, 1/06, 1/22*

**U.S. Cl. 179—146 E** **10 Claims**

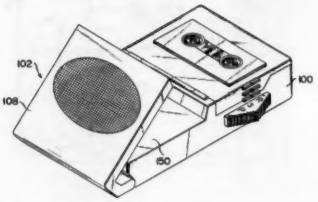
1. An ultra-small portable sound reproducing apparatus comprising:

a loudspeaker holder including a baffle plate;

a portable sound reproducing device having an operating surface opposing the baffle plate and an audio-amplifier for producing a power output signal;

a loudspeaker supported on the baffle plate adapted to receive the power output signal to reproduce sounds; and

connecting means for detachably connecting the loudspeaker holder to the sound reproducing device to permit the backside of the loudspeaker to face the operating surface and to define an opening for permitting the backside of the loudspeaker to communicate with the outside,



said connecting means having an electroconductive pin secured to one of the loudspeaker holder and sound reproducing device and electrically connected to one of the loudspeaker and audio amplifer, and opening fitting means mounted on the other of the loudspeaker holder and portable sound reproducing device and provided with an electroconductive member which is electrically connected to the other of the loudspeaker and audio amplifier and is detachably fitted to the pin.

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**4,303,808**

## LOCATING NOISE IN COMMUNICATIONS SYSTEMS

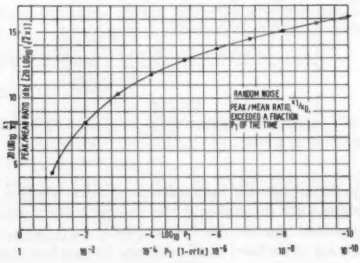
**Thomas Oswald, Dartford, England, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Oct. 10, 1979, Ser. No. 83,492**

**Claims priority, application United Kingdom, Oct. 26, 1978, 41984/78**

**Int. Cl.³ H04B** *3/46*

**U.S. Cl. 179—175.3 F** **19 Claims**




1. A method of locating a source of impulse noise in a communication system comprising the steps of:

measuring the time interval between the same noise impulse arriving at one terminal of said system via two paths of said system having different delays; and

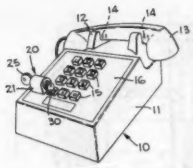
indicating said time interval in a manner representing the distance of said source of said impulse from said one terminal to locate the position of said source of said impulse in said system.

4,303,809

## LOCKING DEVICE FOR TELEPHONE INSTRUMENT

Herbert J. Rubinstein, 15720 Winchester Blvd., Ste. 2C, Los Gatos, Calif. 95030, and Morton K. Rubinstein, 14954 Corona Del Mar, Pacific Palisades, Calif. 90272

Filed Mar. 11, 1980, Ser. No. 129,470
Int. Cl.[3] H01H 9/28; H04M 1/66
U.S. Cl. 179—189 D 18 Claims



1. In combination:

(A) a telephone instrument having an apertured base through which projects at least one depressible dialing element; and

(B) a locking device comprising;

(a) a body mounted on said base of said telephone instrument, said body being formed with a bore; and

(b) a movable member disposed in said bore, one end of said movable member being movable in one direction into confronting relation with said dialing element for depressing said depressible dialing element for locking said telephone instrument and being movable in another direction for releasing said depressed dialing element to enable said telephone instrument to operate.

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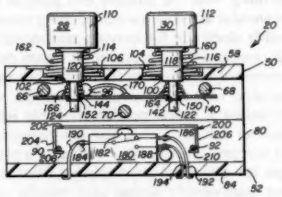
4,303,810

## TWO SPEED SWITCH

Eugene E. Oard, 1306 Lakeshore, Rockwall, Tex. 75087

Filed Oct. 29, 1979, Ser. No. 88,559
Int. Cl.[3] H01H 3/12
U.S. Cl. 200—5 R 15 Claims



6. A two speed switch for operating a motor in a first and a second direction at a first and second speed, comprising:

a contact bar,

first, second and third terminals, wherein closing a circuit across said first and third terminals operates the motor in a first direction and closing a circuit across said second and third terminals operates the motor in a second direction,

first bias means for selectively moving said contact bar to engage said first and third terminals,

second bias means for selectively moving said contact bar to engage said second and third terminals, and

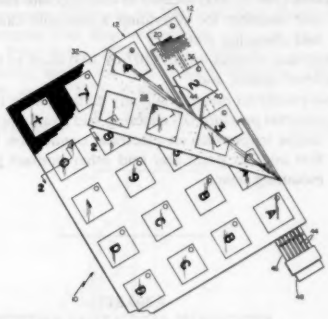
switch means for operating the first and second speeds of said motor and positioned to be engaged by overtravel of either said first or second bias means, said switch means being operable to operate the first or second speed of said motor when said contact bar is in engagement with said third terminal.

4,303,811

## KIT FOR USE IN THE CONSTRUCTION OF CUSTOM PROTOTYPE MEMBRANE SWITCH PANELS

Wayne K. Parkinson, Mequon, Wis., assignor to W. H. Brady Co., Milwaukee, Wis.

Filed Dec. 3, 1979, Ser. No. 99,628
Int. Cl.[3] H01H 9/00, 13/70
U.S. Cl. 200—5 A 5 Claims



1. A kit capable of being assembled into a prototype membrane switch comprising

a plurality of switch units

each said switch unit comprising at least one membrane switch, each said membrane switch including upper and lower plastic membranes, electrical contact portions adhered to said membranes, and a spacer element between said membranes, and

an overlay sheet adapted to be affixed to the upper surfaces of each of said switch units,

said overlay sheet having twice or more the area of each said switch unit and the shape of each said unit being selected so as to permit said plurality of units to be affixed in side-by-side relationship beneath said overlay sheet, and

said overlay sheet being provided with indicia areas at locations selected to be coordinated with switch portions of said plurality of switch units upon assembly.

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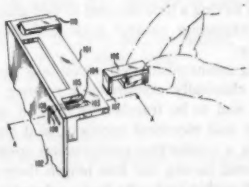
4,303,812

## SELF-LOCKING SWITCH CONTACT MEMBER

Uday S. Kapadia, Elizabeth, and John W. Logioco, Middletown, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 31, 1979, Ser. No. 108,668
Int. Cl.[3] H01H 19/00
U.S. Cl. 200—6 R 8 Claims



1. A switching device (**106** or **302**) for selectively connecting a first contact point (**103** or **304**) of a mounting board (**101** or **301**) with at least one other contact point (**104** or **306**) thereon, said switching device being adapted for mounting by clamping on to said mounting board between a slot (**105** or **308**) in said mounting board and an edge (**203** or **309**) of said mounting board

characterized in that

said switching device is constructed as a unitary resilient dielectric member including one end having an open loop,

means (**201**, **202**, **205** or **307**, **310**, **311**) located at said open loop end of said member for clamping said member around an area of said mounting board between said slot and said edge of said mounting board,

means (**206** or **312**) located at end opposite said loop end of said member for providing a movable cantilever about said clamping means,

electrical contact means (**107** or **303**) fixed to the tip of said cantilever means, and

said cantilever means resiliently deflectable in response to an external pressure (P) enabling said fixed electrical contact means to provide an electrical connection between said first contact point and said other contact point on said mounting board.

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**4,303,813**

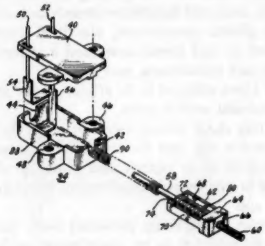
## PRECISION ACTUATION SWITCH

**Paul D. Cary, Fountain Valley, Calif., assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Aug. 23, 1979, Ser. No. 68,952**

**Int. Cl.**[3] **H01H** *3/16*

**U.S. Cl. 200—52 R** **4 Claims**



**1**. An electrical switch which is mountable adjacent to a movable member for sensing a desired position of the member, comprising:

a housing having a longitudinal axis;

a pair of electrical contacts positioned within said housing adjacent to the axis and adapted to be connected to circuitry means;

an actuator means adapted to be operable along the axis between said contacts, said actuator means including a plunger having one end extending from said housing, and a yoke having a base secured to said plunger and having a body extending parallel with said plunger within said housing;

a shorting means positioned within said housing and adapted to be elastically compressible relative to said actuator means and to be translatable by said actuator means to engage said electrical contacts, said shorting means including a conductive compression spring adapted to be positioned having the free length thereof partially compressed within said yoke body, whereby a predetermined force will be required to further compress said spring to facilitate positive electrical conduction upon abuttment with said electrical contacts; and

biasing means to urge said shorting means away from said contacts whereby the switch will be actuated by the position of the plunger of said actuator means corresponding to a position of the member.

**4,303,814**

## GAS-BLAST POWER SWITCH

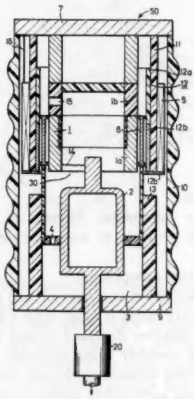
**Klaus Scheibe, Salzgitter, Fed. Rep. of Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Fed. Rep. of Germany**

**Filed Feb. 28, 1979, Ser. No. 15,941**

**Claims priority, application Fed. Rep. of Germany, Mar. 6, 1978, 2809509**

**Int. Cl.**[3] **H01H** *33/88*

**U.S. Cl. 200—147 R** **7 Claims**



**1**. A power switch in which an arc is produced in an arc area comprising, a fixed electrode having an annular end portion, a movable electrode having a contact portion for engagement with the annular end portion of said fixed electrode and a projecting portion which extend into the annular end portion of said fixed electrode, said movable electrode being mounted for movement co-axially of said fixed electrode into a position contacting the annular end portion of said fixed electrode and into an open position spaced from the fixed electrode still co-axial therewith, with the projecting portion of said movable electrode forming with the annular end portion of said fixed electrode an annular arc area, switch opening means connected to said movable electrode for moving said movable electrode between said contact and open positions, means defining an arc quenching compression chamber for containing an arc quenching gas associated with said movable electrode, said movable electrode including a piston portion movable into said compression chamber for displacing the gas therein, said means defining said compression chamber including a plurality of gas flow passages for directing gas displaced from said compression chamber transversely across said annular arc area and transversely across an arc formed therein, and magnetic field means associated with said fixed and movable electrodes disposed co-axially of the annular arc area for producing a magnetic field in said annular arc area when the power switch is opened to cause rotation of an arc formed in said arc area between said fixed and movable electrodes.

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**4,303,815**

## PUSH BUTTON SWITCH ASSEMBLY

**Yuho Ishikawa, Chiba, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Mar. 19, 1980, Ser. No. 131,835**

**Claims priority, application Japan, Mar. 22, 1979, 54-37128[U]**

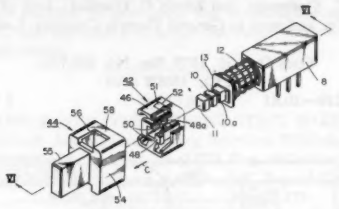
**Int. Cl.**[3] **H01H** *3/12, 3/32*

**U.S. Cl. 200—330** **6 Claims**

**1**. In a push button switch assembly for an electronic apparatus having a push button switch, an operating rod associated with said push button switch and wherein said operating rod is movable between first and second positions to activate said

push button switch and a push button knob operative to move said operating rod between its said first and second positions, the improvement comprising means for positively and resiliently coupling said operating rod to said push button knob comprising:

a coupling member having a first segment for positively and securely engaging a free end of said operating rod;



a second segment spaced radially from said first segment for positively and securely engaging said push button knob; and

elastic and resilient connecting members interconnecting said first and second segments of said coupling members to provide a resilient and flexible interconnection between said first and second segments in all directions except in the direction of movement of said operating rod when said rod moves between its first and second positions.

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**4,303,816**

## COOKER APPARATUS FOR HEATING A COOKING POT INDUCTIVELY

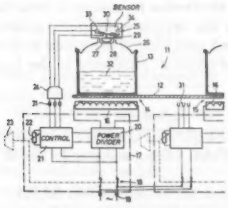
**Gerhard Goessler, and Friedrich Koch, both of Oberderdingen, Fed. Rep. of Germany, assignors to E.G.O. Regeltechnik GmbH, Fed. Rep. of Germany**

**Filed Jan. 16, 1980, Ser. No. 112,679**

**Claims priority, application Fed. Rep. of Germany, Jan. 16, 1979, 2901556**

**Int. Cl.³ H05B** *5/04*

**U.S. Cl. 219—10.49 R** **11 Claims**




1. An electric cooking apparatus for inductively heating a cooking pot, said apparatus comprising:

a cooking pot at least partly comprising an electrically conductive material;

an electric induction heating coil for heating the cooking pot by inducing a current in the electrically conductive material thereof;

a device for controlling electrical power delivered to the induction heating coil, the control device having a temperature-dependent guiding and control means; and

a temperature sensor unit adapted to be so positioned on the cooking pot, over matter being heated therein, as to be there subjected to rising steam formed in the cooking pot by the matter being heated, the sensor unit having means for transmitting control signals to the guiding and control means.

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**4,303,817**

## MICROWAVE OVEN

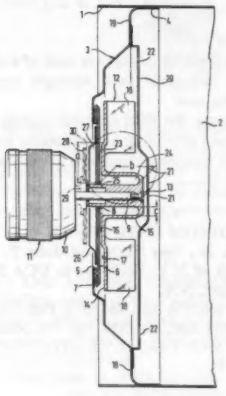
**Johann Klement, and Werner Schnabel, both of Traunreut, Fed. Rep. of Germany, assignors to Bosch-Siemens Hausgeräte GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Jul. 9, 1979, Ser. No. 56,073**

**Claims priority, application Fed. Rep. of Germany, Jul. 12, 1978, 2830658; Aug. 4, 1978, 2834368**

**Int. Cl.³ H05B** *6/76*

**U.S. Cl. 219—10.55 D** **18 Claims**



1. Microwave oven, comprising an oven muffle connected to a high-frequency oscillator, a metallic muffle wall having an opening formed therein, a rotatable shaft extended through the opening in the metallic muffle wall, a microwave seal in the area of the opening in the form of a metallic disc connected to the shaft and disposed parallel to the muffle wall at a small distance therefrom forming a gap-like microwave transmission line between the metallic disc and the muffle wall, said metallic disc having an annular-slot-like microwave pocket formed therein with another opening at one end of the pocket being disposed adjacent the gap-like microwave transmission line and adjacent the opening in the metallic muffle wall.

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**4,303,818**

## MICROWAVE OVEN HUMIDITY SENSING ARRANGEMENT

**Peter H. Smith, Anchorage, Ky., assignor to General Electric Company, Louisville, Ky.**

**Filed Oct. 29, 1979, Ser. No. 88,961**

**Int. Cl.³ H05B** *9/06*

**U.S. Cl. 219—10.55 B** **12 Claims**

1. In a microwave oven,

a microwave heating cavity;

a source of microwave energy;

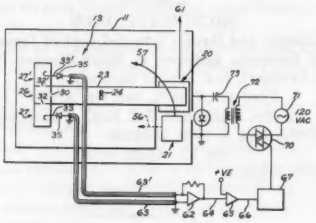
a waveguide for coupling said source of microwave energy to said cavity;

a pair of resonant microwave chambers, including an active chamber and a passive chamber;

a splitter electromagnetically coupled to each of said waveguide and said active and passive chambers for sampling a portion of microwave energy from said source and coupling a substantially equal amount of the sample to each of said chambers;

means for establishing direct communication between said

cavity and said active chamber whereby humidity conditions in said cavity are represented in said active chamber and influence the strength of the electric field in said active chamber;



means for sensing the field strength in each of said chambers and providing individual field strength signals corresponding thereto; and

means for comparing the field strength signals from both said chambers and providing a comparator output signal indicative of the humidity condition in said cavity.

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**4,303,819**

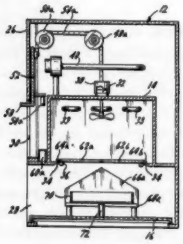
## BOTTOM ENTRY OVEN

**Harold B. Kaufman, Jr., New York, and John P. McCarthy, College Point, both of N.Y., assignors to DCA Food Industries, Inc., New York, N.Y.**

**Division of Ser. No. 900,179, Apr. 26, 1978, Pat. No. 4,219,716. This application Apr. 25, 1980, Ser. No. 143,717**

**Int. Cl.**[3] **H05B** *9/06;* **F24C** *15/16;* **A21B** *2/00, 3/02*

**U.S. Cl. 219—10.55 R** **4 Claims**



**1.** An oven for providing uniform energy exposure to food products successively loaded therein during a heating cycle comprising a heating cavity having a bottom opening therein, a bottom hatch mounted for relative movement with respect to said heating cavity between a lowered position and a raised position, and means for moving said hatch between said lowered position and said raised position including a lifting handle assembly having a lifting handle accessible to the operator of the oven, means linking said lifting handle assembly with said hatch to enable downward force on said lifting handle to cause said hatch to be raised from the lowered position to the raised position including at least first and second hatch support rods each having a first end secured to said hatch at spaced locations thereon and extending substantially vertically upward therefrom, first and second sleeve bearings respectively surrounding said first and second hatch support rods and secured against movement therewith, said sleeve bearings being sized relative to such support rods to permit same to undergo sliding movement relative thereto, linkage member coupled between the second ends respectively of said hatch support rods and the lifting handle assembly, and latching means for maintaining said hatch in its closed position and upon completion of the heating cycle permitting the hatch to undergo controlled descent under the influence of gravity to its lowered position.

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**4,303,820**

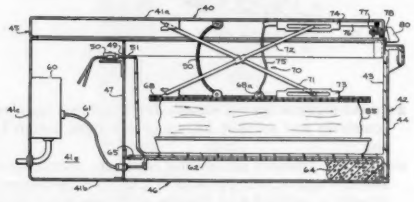
## CAPACITATIVE APPARATUS FOR THAWING FROZEN FOOD IN A REFRIGERATION APPLIANCE

**Richard L. Stottmann, and Edwin C. Eisenbeis, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.**

**Filed Dec. 31, 1979, Ser. No. 108,754**

**Int. Cl.**[3] **H05B** *6/46*

**U.S. Cl. 219—10.81** **8 Claims**



**1.** In a household refrigeration appliance, food thawing apparatus comprising:

a compartment having top, bottom, back and side walls shielded against electromagnetic energy radiation and having a front access opening;

a drawer adapted to be inserted through the access opening into the compartment and having a front face shielded against electromagnetic energy radiation so as to form, with the compartment, a fully shielded enclosure;

a first planar electrode disposed beneath the drawer bottom;

a second planar electrode movably attached to the compartment and having a retracted position above the drawer to permit removal of the drawer from the compartment and adapted to be movable into the drawer into close physical proximity with a food load in the drawer said first and second electrodes thereby defining a food thawing zone;

means for supplying low power electromagnetic energy to said electrodes to provide gentle heating of a food load in the food thawing zone;

and safety interlock means for enabling said energy to be applied to said electrodes to initiate a food thawing process only when the drawer is properly positioned in the compartment and said second electrode is lowered to its position in close physical proximity to the food load.

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**4,303,821**

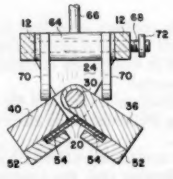
## STRIP WELDING FOR BUTT JOINTS

**Robert M. Preston, Tulsa, Okla., assignor to David J. Eastin, a part interest**

**Filed Nov. 19, 1979, Ser. No. 95,551**

**Int. Cl.**[3] **B23K** *9/18, 9/28*

**U.S. Cl. 219—73** **7 Claims**



**1.** An apparatus in combination with a welding head and a supply of a plurality of welding ribbons being comprised of:

a vertical brace secured to said welding head and provided

with a plurality of spaced horizontal members extending outwardly therefrom and an opening spaced between said members;

a plurality of jaw assemblies being pivotally connected between said horizontal members with one of said ribbons passing through each of said jaw assemblies;

means within said jaw assemblies to adjust the distance between said ribbons; and

means attached to said brace and in communication with said jaw assemblies to adjust the relative angle between said ribbons.

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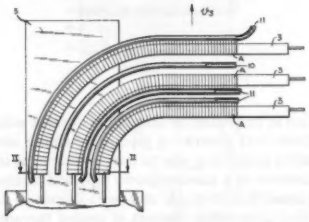
**4,303,822**

## APPARATUS FOR WELDING STEEL SHEETS

**Peter Hirsch, Aachen-Laurensberg; Bernhard Wübbels, Borken, and Rolf Schäfer, Aachen, all of Fed. Rep. of Germany, assignors to Friedrich Eichhorn, Aachen, Fed. Rep. of Germany**

**Filed Sep. 24, 1979, Ser. No. 78,179**
**Int. Cl.³ B23K *9/18***
**U.S. Cl. 219—73.1** **2 Claims**



1. In an apparatus for electroslag welding of steel sheets with the aid of at least one wire electrode pair, a welding gap being defined between the electrodes of said electrode pair, current-carrying means for the electrode pair, and supply means for supplying metal in a powdered state, and welding powder into said welding gap,

the improvement comprising:

shielding means creating an elongated area along said current-carrying means, said elongated area, owing to the shielding means, being substantially free of any magnetic field, and wherein said supply means includes at least one supply tube positioned in said elongated area.

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**4,303,823**

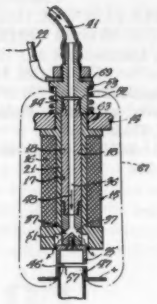
## WELDING DEVICE

**Robert E. Stine, Racine, Wis., assignor to Modine Manufacturing Company, Racine, Wis.**

**Filed Jan. 24, 1980, Ser. No. 115,115**
**Int. Cl.³ B23K *9/12***
**U.S. Cl. 219—75** **2 Claims**

1. A multiple electrode magnetic arc welder, comprising:

a plurality of electrodes arranged in a preselected pattern corresponding to the arrangement of the welds to be made by said electrodes; means mounting said electrodes for movement from a retracted inoperative position toward the respective work areas where the welding takes place and back to said retracted position; means for moving each electrode in a preselected sequence into close proximity welding position to its workpiece for welding the workpiece, said means for moving each said electrode comprising a solenoid for each electrode including a core on which a said electrode is mounted, the solenoid thereby comprising means when energized for projecting said electrode into working position relative to its workpiece; means for automatically retracting said electrode to said inoperative position upon de-energizing of said solenoid comprising spring means constantly urging said electrode to said inoperative position; means for automatically projecting an inert pressurized gas substantially completely enveloping the electrode and workpiece adjacent to the electrode upon said moving of the electrode into operative position comprising gas passage means for said gas having a passage exit adjacent to said workpiece; and



means on said electrode closing said passage exit when said electrode is in said retracted inoperative position and opening said exit when in said operative position, said means for retracting comprising means for automatically de-energizing the individual electrodes.

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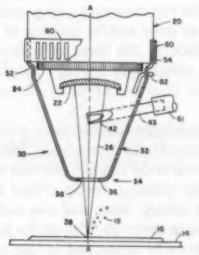
**4,303,824**

## METHOD AND APPARATUS PROTECTING A LENS FROM AIRBORNE PARTICULATES

**John H. Morgan, Albuquerque, and Larry W. Sutton, Peralta, both of N. Mex., assignors to GTE Automatic Electric Laboratories, Inc., Northlake, Ill.**

**Filed May 12, 1980, Ser. No. 149,805**
**Int. Cl.³ B23K *27/00***
**U.S. Cl. 219—121 FS** **5 Claims**



1. Apparatus for inhibiting particulate contaminants in the atmosphere from contacting the surface of a lens, comprising:

a member having a hollow frustaconically shaped inner surface with concentric openings at opposite ends thereof, the lens surface being aligned with the larger opening in one end of said member so that the lens axis extends through the two openings;

first means providing a generally airtight seal between the one end of said member and the lens;

a source of pressurized gas; and

second means introducing pressurized gas from said source into the conically shaped interior surface of said member near the one end thereof along a first line that is offset from the lens axis and generally parallel to a line that is tangent to said inner surface of said member in a plane orthogonal to the lens axis so as to produce a vortex of gas in said member that exits into the atmosphere through the smaller opening in said member with sufficient velocity

and vorticity for inhibiting passage of particulates in motion outside of said member from entering into the second opening.

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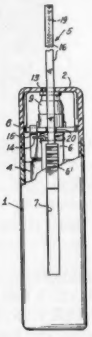
**4,303,825**

## PORTABLE ELECTRIC HEATING DEVICE FOR THAWING MOTOR VEHICLE DOOR LOCKS

**Niilo Jaronen, Lammasrinne 3 D 79, 01710 Vantaa 71, Finland**

**Division of Ser. No. 951,834, Oct. 16, 1978, Pat. No. 4,247,753.**
**This application Jul. 13, 1979, Ser. No. 57,349**
**Claims priority, application Finland, Oct. 20, 1977, 773109; Nov. 21, 1977, 773509**
**Int. Cl.³ E05B *17/00;* H05B *3/40;* F21V *33/00***
**U.S. Cl. 219—201** **2 Claims**



1. A car battery-operated electrically heated thawing device for thawing frozen car locks including an elongated electrical cable, a connecting plug on one end of said cable insertable into a socket on the car adjacent to the frozen lock and connected to the car battery and a hollow protective case having an opening at the top receiving a ring which is adapted to hold a key for the car door and/or ignition of said car;

a thawing stick in the form of a thin, hollow, flattened, elongated, metal body having a height and width which is less than the thickness of the key fitting into the keyhole of the lock;

an electric resistance heating wire within the hollow inner wall portion of said metal body and extending from the center of said body toward one end thereof, said one end of said body defining the tip of said stick, the end of said wire being spaced from said one end of said body a distance between about 10–15% of the length of the stick and being electrically connected to said one end of said body by an electrically conductive member;

a conductor in said metal body connected to the other end of said wire and extending from the other end of said body for connecting said cable to said resistance wire, said resistance wire and conductor being electrically insulated from said metal body;

plastic fastening means at the top of said protective case pivotally connecting the other end of said metal body to said case, means within said plastic fastening means electrically connecting the other end of said cable to said conductor;

said protective case having a narrow side and a wide side, said narrow side being open for receiving said cable in the hollow interior of said protective casing for storage, said stick being pivotable into the open side of said housing to close said open side during non-use; and

said stick being movable by manipulating said protective casing to make electrical contact between said metal body and the metal surface of said lock to complete the electrical circuit to the car battery through said conductive means, resistance wire, conductor and cable and to permit the resistance wire within the stick to become hot.

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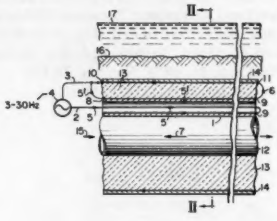
**4,303,826**

## SHIELDED SKIN-EFFECT CURRENT HEATED PIPELINE

**Masao Ando, Yokohamashi, Japan, assignor to Chisso Corporation, Tokyo, Japan**

**Filed Feb. 20, 1980, Ser. No. 123,190**
**Claims priority, application Japan, Feb. 21, 1979, 54-19432**
**Int. Cl.³ H05B *3/00;* F16L *53/00***
**U.S. Cl. 219—301** **4 Claims**




1. In a pipeline to be heated by skin-effect current wherein a skin-effect-current heat-generating pipe as a heating source is laid along a fluid-transporting pipe of the pipeline so as to trace the same and consists of a ferromagnetic pipe and an insulated electric wire passed therethrough, and has a circuit so devised that, when a first alternating current is passed through said electric wire, a second alternating current flows through said ferromagnetic pipe in the direction opposite to that of the first alternating current in response thereto while being concentrated in the vicinity of the inner surface of said ferromagnetic pipe,

the improvement comprising that said pipeline additionally includes an outer covering pipe of a ferromagnetic material provided so as to enclose the outer periphery of both said fluid-transporting pipe and said heat-generating pipe, said covering pipe being electrically connected to at least both end portions of said ferromagnetic pipe; and the thickness of said outer covering pipe being selected so that any alternating current that leaks out of said skin-effect-current pipe substantially does not appear on the outside of said outer covering pipe, but instead flows only through the inner skin portion of said outer covering pipe.

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**4,303,827**

## HEATING APPLIANCE AND THERMOSTAT MOUNT

**Bruce W. Kyles, Asheboro, N.C., assignor to General Electric Company, New York, N.Y.**

**Filed Oct. 10, 1979, Ser. No. 83,356**
**Int. Cl.³ H05B *1/02***
**U.S. Cl. 219—512** **5 Claims**

1. In a liquid heating electrical appliance having a base with an upper exposed surface and electrical means on the opposite side thereof for heating said surface by conduction, thermostat means in circuit with the heating means for controlling the temperature of said heated surface, the thermostat means being a walled packaged unit with an opening through a wall to an internal sensor and adapted for abutment mounting directly against said heating means, an improvement in said thermostat means mounting comprising,

a depressed niche in said heating means adapted to nest the thermostat means therein with said thermostat means being nested in said niche with said opening facing the surface of said heating means,

a heat-conducting projection between said depressed niche and thermostat means,

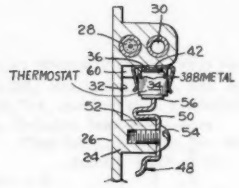
said projection extending thru said opening into said ther-

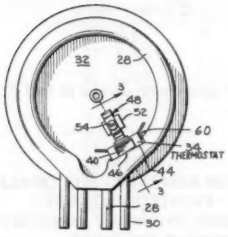
mostat means to be in close heat exchange relation with said sensor,

flexible clamp means securing said thermostat means in said niche,

said clamp means biasing the projection and sensor toward each other for fast thermostat means response directly between the heating means and sensor for base temperature control,

wherein the sensor of the thermostat means comprises an internal heat sensing bimetal and




said projection, matching said opening and being disposed closely adjacent said bimetal when the thermostat means is in said niche,

said thermostat means including,

a metal cover straddling said thermostat means and detachably secured thereto over said opening,

a raised projection on said cover extending contiguous with and thru said wall opening closely adjacent the sensor and forming said projection.

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**4,303,828**

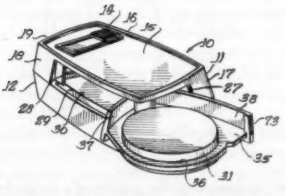
## DISINFECTOR UNIT WITH SWING-OUT TRAY

**Michael D. Thomas, and Francis E. Ryder, both of Arab, Ala., assignors to Ryder International Corporation, Arab, Ala.**

**Filed Apr. 26, 1979, Ser. No. 33,469**

**Int. Cl.[3] A61L 2/04**

**U.S. Cl. 219—521** **12 Claims**




1. A contact lens disinfector unit for sterilizing contact lenses immersed within a disinfecting solution contained within a lens case, said disinfector unit comprising: a housing including a plurality of side walls and top and bottom wall structure, wherein said side walls of said housing define an opening intermediate said top and bottom wall structure; electrical heating means disposed within said housing for heating a lens case, contact lenses and disinfecting solution to an asepticizing temperature, said heating means including an electrically heated heating block having a generally planar upper surface; and tray means including a through aperture; a lens case disposed in said aperture with a base portion of said lens case exposed for engagement with said heater block upper surface; said tray means being pivotally mounted to said housing proximate said opening provided in said side walls, for swinging movement between an open position wherein said lens case receiving aperture is disposed exteriorly of said housing to permit reception and removal of the lens case therefrom as necessary, and a closed position wherein said tray means is received within said housing through said side wall opening to dispose the lens case carried by said tray means in heat transfer contact with said planar upper surface of the heater block, and said tray means including peripheral wall structure arranged to close said housing side wall opening when said tray means is in the closed position.

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**4,303,829**

## METHOD OF AND DEVICE FOR DETERMINING BODY CONTOURS FOR THE MEASUREMENT OF THE ABSORPTION DISTRIBUTION IN A SLICE OF THE BODY

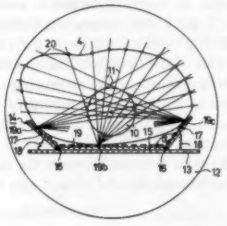
**Wolfgang Wagner, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 9, 1979, Ser. No. 83,195**

**Claims priority, application Fed. Rep. of Germany, Oct. 14, 1978, 2844927**

**Int. Cl.[3] A61B 6/00**

**U.S. Cl. 250—445 T** **10 Claims**




1. In the method for determining a radiation absorption distribution in a plane slice of a body, comprising the steps of irradiating the body in many directions along a plurality of paths in the plane to measure absorption values and calculating the absorption distribution in the slice from the measured absorption values and data describing the contour of the slice, an improved method for determining the contour of the slice which comprises the steps of:

bringing the body into contact with a confining member which contacts the body at a plurality of contact points, situated at least approximately in the plane, the location of which are predetermined or are determined by measurement; and determining the location of first contour points defined by the intersection of the contour with each of a plurality of beam paths which extend through one of the contact points and through an examination zone, the distance between each contour point and a contact point being a value which corresponds to the quotient of the absorption value measured along the associated beam path and a predetermined mean absorption coefficient.

## 4,303,830
## TOMOGRAPHIC APPARATUS FOR PRODUCING TRANSVERSE LAYER IMAGES OF A RADIOGRAPHY SUBJECT

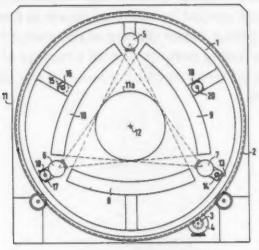
**Karl G. Heinzelmann, Neunkirchen; Güenter Schmitt, Erlangen, and Edgar Tschunt, Rathsberg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Oct. 22, 1979, Ser. No. 86,821**

**Claims priority, application Fed. Rep. of Germany, Dec. 7, 1978, 2852968**

**Int. Cl.³ G03B *41/16***

**U.S. Cl. 250—445 T** **4 Claims**



1. A tomographic apparatus for producing transverse layer images of a radiography subject, having measuring units comprising several sources of radiation arranged with their focuses angularly offset by angles of equal size, and a radiation measuring arrangement which comprises radiation receivers for determining the radiation intensity behind the subject, having a drive device which drives a rotating frame for the radiation sources so as to rotate the radiation sources about an axis of rotation (**12**), and also having a measured value converter for transforming the signals supplied by the radiation receivers into layer images, at least one radiation source and radiation receiver (**6**, **9**; **7**, **10**) of the measuring units (**5**, **8**; **6**, **9**; **7**, **10**) being arranged offset in the direction of the axis of rotation (**12**) relative to another of the measuring units, and means comprising the offset arrangement of the measuring units for effecting the simultaneously scanning of a plurality of layers during rotation of said rotating frame about the axis of rotation (**12**), characterized in that, adjusting means (**13** to **20**) are provided for adjusting the axial distance between the measuring units (**5**, **8**; **6**, **9**; **7**, **10**), measured parallel to said axis of rotation (**12**).

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## 4,303,831
## OPTICALLY TRIGGERED LINEAR BILATERAL SWITCH

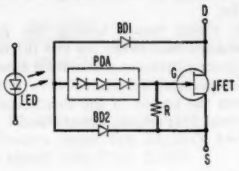
**Mahmoud A. El Hamamsy, Watchung, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

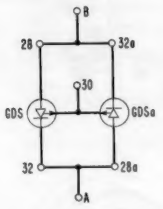
**Continuation-in-part of Ser. No. 61,941, Jul. 30, 1979, abandoned. This application May 30, 1980, Ser. No. 154,856**

**Int. Cl.³ G02B *27/00*; H03K *17/687***

**U.S. Cl. 250—551** **8 Claims**

1. An optically triggered bilateral switch comprising: a voltage controlled device, said voltage controlled device having source, gate, and drain electrodes; a light source; a first diode connected to said source electrode; a second diode connected to said drain electrode; and means for controlling the current through said voltage controlled device, said means being optically coupled to said light source and producing a voltage when illuminated that controls said current through said voltage controlled device, characterized in that said means for controlling comprises a series connected photodiode array




connected to said gate electrode and to said first and second diodes.

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## 4,303,832
## PROCESS FOR ASSESSING THE QUALITY OF A PRINTED PRODUCT

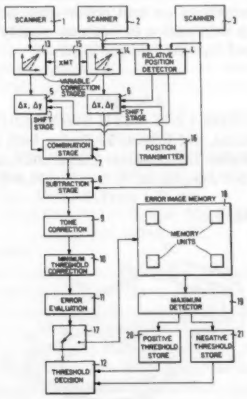
**Kurt Ehrat, Steinmaur, Switzerland, assignor to Gretag Aktiengesellschaft, Regensdorf, Switzerland**

**Filed Dec. 11, 1979, Ser. No. 102,419**

**Claims priority, application Switzerland, Dec. 18, 1978, 12832/78**

**Int. Cl.³ G06K *5/00***

**U.S. Cl. 250—556** **12 Claims**




1. A process for assessing the quality of a printed product by point-by-point comparison of a specimen under test and an original, comprising the steps of forming values representing the differences between the reflectances of individual image points of the specimen produced by point-by-point photoelectric scanning and the reflectances of image points of the original corresponding to the image points of the specimen, processing the resultant difference values in accordance with

specific criteria, and evaluating said values by making a final threshold value decision utilizing at least one of an individual positive threshold value and an individual negative threshold value for each individual image point, said threshold values being produced by error analysis for each image point of reference printed products having the maximum acceptable errors.

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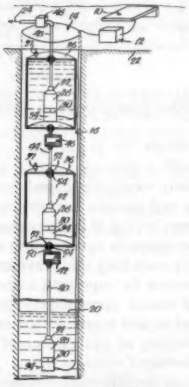
**4,303,833**

## NATURAL ENERGY OPERATED PUMP SYSTEM

**John D. Eckel, Hazelgreen, Wis., and Amos M. Einerson, Ropesville, Tex., assignors to A. Y. McDonald Manufacturing Company, Dubuque, Iowa**

**Filed Jul. 7, 1980, Ser. No. 166,108**
**Int. Cl.³ F04B *47/06***
**U.S. Cl. 290—1 R** **11 Claims**



1. A liquid retrieval system comprising:

means for receiving naturally occurring energy in kinetic or wave form and for converting said naturally occurring energy to electrical energy and having a preselected maximum instantaneous power output;

a plurality of relatively small electric pumps each requiring, for operation, electrical energy, the total power requirements of said pumps being greater than said preselected maximum power of said energy converting means;

each pump having an inlet and an outlet;

means for disposing said pumps one above the other in a well or the like with the lowest pump inlet being adapted to be in fluid communication with the ground water in a well or the like with which said system may be used;

a plurality of vertically spaced reservoirs above said lowest pump, each said reservoir being in fluid communication with the inlet of an associated pump and with the outlet of the next lowermost pump; and

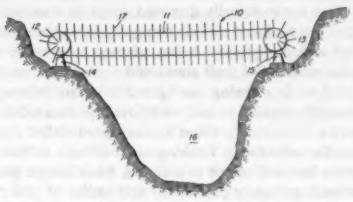
control means for selectively operating said pumps such that the instantaneous total electrical energy demand of the system does not exceed the instantaneous electrical energy available from said naturally occurring energy receiving means to direct water to the reservoir associated with the next higher pump, whereby said naturally occurring energy receiving means may be of relatively small electrical energy conversion capacity and therefore inexpensive and yet provide for the retrieval of liquid from a relatively deep well or the like.

**4,303,834**

## CABLE WIND MILL

**Yao T. Li, Lincoln, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed May 10, 1979, Ser. No. 37,667**
**Int. Cl.³ F01D *23/00*; F03D *5/02***
**U.S. Cl. 290—55** **8 Claims**



1. Wind power generating apparatus comprising:

(1) at least one endless flexible cable supported on the peripheries of two spaced apart wheels, said cable thereby forming an elongate loop, the plane of said loop being substantially perpendicular to the wind direction;

(2) a plurality of airfoils attached to said cable at spaced apart intervals along said cable and disposed for generating aerodynamic forces in a first direction along said cable when said airfoils are on one side of said loop and in the opposite direction when said airfoils are on the other side of said loop; said aerodynamic forces thereby causing said cable and said wheels to rotate;

(3) means for absorbing power from at least one of said rotating wheels; and

(4) means for applying lateral force to said cable at least at one location intermediate said wheels to counteract the lateral wind loading on said cable arising from the action of the wind on said airfoils.

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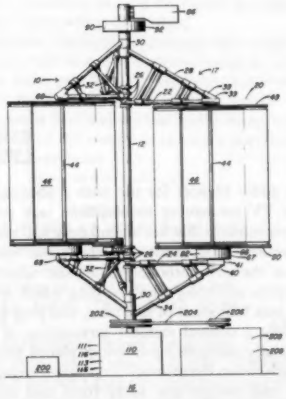
**4,303,835**

## WIND POWERED GENERATOR WITH CYCLIC AIRFOIL LATCHING

**Puran Bair, 49 Elliot St., Jamaica Plain, Mass. 02130**

**Filed Mar. 31, 1980, Ser. No. 135,343**
**Int. Cl.³ F01D *7/00*; F03D *7/06***
**U.S. Cl. 290—55** **31 Claims**



1. A wind powered generator comprising:

support means;

a framework rotatable with respect to said support means about a central axis;

a plurality of airfoil shafts, each airfoil shaft being adapted to

revolve in a circle with a fixed radius about said central axis through a leeward sector wherein said airfoil shafts move in generally the same direction as a windflow direction and through a windward sector wherein said airfoil shafts move in a direction generally opposite of said windflow direction;

an airfoil associated with each airfoil shaft and having a surface symmetrically disposed about its associated airfoil shaft, each of said airfoils being rotatable about its associated airfoil shaft and being adapted to revolve with its associated airfoil shaft about said central axis, each of said airfoil surfaces being configured to rotate into a position generally parallel to said windflow direction when permitted to rotate freely about its associated airfoil shaft; and

means for selectively latching each of said airfoils in said entire leeward sector in a single, fixed torque producing position generally parallel to said radius of said circle of revolution to generate wind-produced torque about said central axis, and for selectively unlatching each of said airfoils in at least a portion of said windward sector to permit each unlatched airfoil to rotate freely into a position generally parallel to said windflow direction.

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**4,303,836**

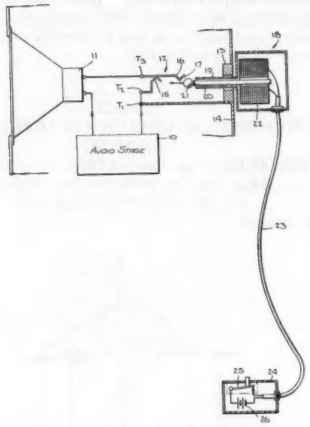
## AUDIO SILENCER FOR RADIO AND T-V SETS

**Daniel Lyman, R.D. 2, Box 119, Wells Bridge, N.Y. 13859**

**Filed Feb. 28, 1980, Ser. No. 125,524**

**Int. Cl.³ H01H** *3/02;* **H02J** *13/00*

**U.S. Cl. 307—114** **8 Claims**




1. An audio silencer for use with a phonograph amplifier, radio or TV set having an earphone jack provided with a flexible switch arm that has an end nose and normally engages a contact arm to connect an audio signal line to the loudspeaker of the set to produce sound, said silencer comprising:

A. a probe including a hollow plug which when inserted in the jack falls short of said nose, said plug having disposed therein a control member terminating in a head which normally occupies a position displaced from the nose and which, when the member is operated, engages said nose to flex said switch arm away from said contact arm and thereby cut off the sound, and a local actuator operatively coupled to said member to operate same; and

B. a remote actuator disposed at a listening post and manually operable to transmit control signals to said local actuator to selectively operate said member to cut off and restore the sound.

**4,303,837**

## WAVEFORM SYNTHESIZER WITH DIGITALLY CONTROLLED PHASE ADJUSTMENT OF OUTPUT

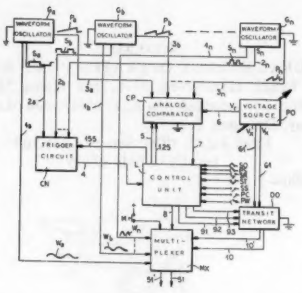
**Renato Ansaldi, and Sergio Vallero, both of Turin, Italy, assignors to Cselt-Centro Studi e Laboratori Telecomunicazioni S.p.A., Turin, Italy**

**Continuation-in-part of Ser. No. 883,581, Mar. 6, 1978, abandoned. This application Sep. 7, 1979, Ser. No. 73,302**

**Claims priority, application Italy, Mar. 9, 1977, 67508 A/77**

**Int. Cl.³ H03K** *3/023, 4/08, 3/78;* **H03L** *7/16*

**U.S. Cl. 307—262** **10 Claims**




1. A controlled generator of an alternating waveform, comprising:

oscillator means for producing a periodic waveform together with a phase-indicating signal in the form of a substantially sawtooth-shaped voltage having the same period as said periodic waveform;

a multiplexer having at least one output, said multiplexer being operationally connected to said oscillator means for selectively switching said waveform onto said output;

a voltage source for supplying a predetermined potential;

comparator means operationally linked to said oscillator means and to said source for generating an enabling pulse upon detecting an equivalence of said potential and said sawtooth-shaped voltage; and

a logic circuit operationally coupled with said comparator means and with said multiplexer for controlling same in response to said enabling pulse, producing on said output an oscillating voltage having a predetermined initial phase and a predetermined final phase.

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**4,303,838**

## MASTER-SLAVE FLIP-FLOP CIRCUITS

**Kenneth W. Lambert, Halesowen, England, assignor to Lucas Industries Limited, Birmingham, England**

**Filed May 14, 1979, Ser. No. 38,859**

**Claims priority, application United Kingdom, May 31, 1978, 24847/78**

**Int. Cl.³ H03K** *3/289*

**U.S. Cl. 307—272 A** **2 Claims**

1. A d.c.-triggered master-slave flip-flop circuit for operation in conjunction with a signal source, said circuit comprising:

a master flip-flop circuit having an input and an output, the voltage at said input determining the state of the master flip-flop circuit;

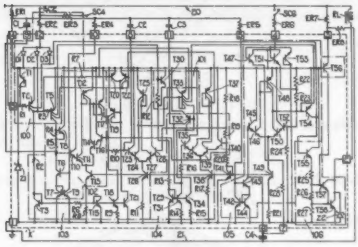
means providing positive feedback from the output to the input of the master flip-flop circuit;

slave circuit means, having an input and an output, for alternatively connecting said signal source and said output of said slave circuit means to said master flip-flop circuit input;

means connecting said input of said slave circuit means to said output of said master flip-flop circuit;

capacitive delay means, connected to the input of each of the

master flip-flop circuit and the slave circuit means, for rendering the master flip-flop circuit and the slave circuit means immune to noise pulses and unintended multiple triggering;



wherein each of the master flip-flop circuit and the slave circuit means includes a d.c. input and incorporates current source means controllable by the d.c. input to charge and discharge the associated capacitive delay means; and comparator means connected to compare the voltage on said capacitive delay means with a reference voltage.

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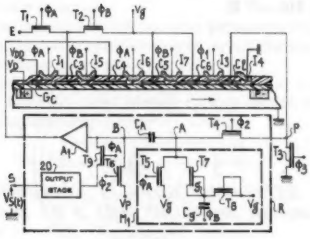
**4,303,839**

## PROCESS FOR FILTERING AN ELECTRICAL SIGNAL BY CHARGE TRANSFER INTO A SEMICONDUCTOR AND SWITCH CAPACITOR FILTER USING SUCH A PROCESS

**Jean L. Berger, and Jean L. Coutures, both of Paris, France, assignors to Thomson CSF, Paris, France**

**Filed Dec. 5, 1979, Ser. No. 100,483**
**Claims priority, application France, Dec. 12, 1978, 78 34881**
**Int. Cl.[3] H03K** *3/353;* **G11C** *19/28;* **H01L** *29/78*
**U.S. Cl. 307—304** **10 Claims**



1. A switched capacitor filter using a process for filtering an electrical signal by transferring charges into a semiconductor substrate, which is covered with a first insulating layer on which is arranged a first group of electrodes constituting with the first insulating layer and the substrate charge storage capacitors, whilst a second group of electrodes is interposed with the first and is separated therefrom by a second insulating layer, the electrodes of said second group constituting with the first and the second insulating layers and the substrate switches which control the transfer of charges between the storage capacitors, wherein the processing of each sample of the electrical input signal comprises the following stages:

(a) a quantity of charges corresponding to the sample of the electrical input signal during processing is introduced beneath the first capacitor ($C_3$) in the charge transfer direction;

(b) beneath the last capacitor ($C_6$), in the charge transfer direction is introduced a quantity of charges which is equal to that already there, during the processing of the preceding sample of the electrical input signal and prior to the beginning of the transfer of charges from said last capacitor to means which convert the charges into an electrical voltage;

(c) a common surface potential is established between two successive capacitors, whereby during the said stage the capacitors are brought to a constant potential $V_g$;

(d) the charges are transferred from the last capacitor in the charge transfer direction to means which convert the charges into an electrical voltage; the order of stages (a) and (b) in the process is random, but stages (a) and (b) must precede stage (c), which must precede stage (d); wherein said filter comprises a diode (D) located in the semiconductor substrate (1) and raised to a constant potential $V_D$ and a grid ($G_C$) located in the same plane as the storage capacitors ($C_3$, $C_4$, $C_5$, $C_6$) and raised to a constant potential $V_{DD}$ which exceeds $V_D$, which controls the current supplied by the diode, the grid being separated from the first capacitor in the charge transfer direction by a switch $I_1$ located in the same plane as the other switches ($I_5$, $I_6$, $I_7$) and the first capacitor being connected to the common point of two transistors $T_1$ and $T_2$, arranged in series, and respectively connected to the input signal E and to the voltage $V_g$, transistors $T_1$ and $T_2$ and switch $I_1$ being subject to periodic potentials ($\phi_A$, $\phi_B$) such that during stage (a) of the process, transistor $T_1$ is conductive and switch $I_1$ is switched off and during stage (c) transistor $T_2$ conducts.

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**4,303,840**

## SINGLE BEAM SECOND HARMONIC GENERATION IN ISOTROPIC MEDIA

**John E. Bjorkholm, Holmdel; Richard R. Freeman, Middletown; Richard L. Panock, Ocean, all of N.J., and William E. Cooke, Los Angeles, Calif., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Oct. 27, 1980, Ser. No. 201,145**
**Int. Cl.[3] H03F** *7/00*
**U.S. Cl. 307—427** **5 Claims**

1. Apparatus for providing second harmonic generation of radiation in a laser beam which comprises:

an isotropic medium, disposed to intercept said radiation in said laser beam, said isotropic medium having a two-photon transition between a first level and a second level with a quadrupole moment therebetween, the energy difference between said first and second levels being substantially close to twice the energy of at least a portion of the photons in said laser beam.

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**4,303,841**

## VMOS/BIPOLAR POWER SWITCH

**Richard H. Baker, Bedford, Mass., assignor to Exxon Research & Engineering Co., Florham Park, N.J.**

**Filed May 21, 1979, Ser. No. 41,008**
**Int. Cl.[3] H03K** *17/04, 17/284, 17/56*
**U.S. Cl. 307—570** **4 Claims**

1. A high-power switching circuit comprising:

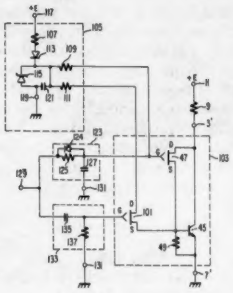
a first vertical metal oxide semiconductor (VMOS) field effect transistor having a gate electrode receptive of a first control signal, a drain electrode and a source electrode;

a first bipolar power transistor having a collector electrode connected to said drain electrode of the VMOS transistor, and receptive of a first operating voltage, a base electrode connected to said source electrode of said VMOS transistor, and an emitter electrode;

means receptive to said first control signal and including the

characteristics of said VMOS transistor for biasing said bipolar transistor to an operating point within a range up to the edge of saturation; and

switching transistor means having a control electrode receptive of a second control signal, and a main current path connected between a source of a second operating voltage and the base electrode of said first bipolar transistor switch, said second control signal being applied to the control electrode of said switching transistor means prior to the application of said first control signal to the gate of said first VMOS transistor, said switching transistor means being responsive to said second control signal for substantially lowering the impedance of its main current



path for permitting current flow therethrough into the base electrode of and for initiating the turn on of said first bipolar transistor switch, the latter lowering the voltage at its collector as it begins to turn on and reduce the impedance between its collector and emitter electrodes, and substantially immediately thereafter said first control signal being applied to the gate of said first VMOS transistor, for turning the latter on to complete the turn on of said first bipolar transistor switch, after which time said control signal is removed, turning off said switching transistor means, whereby in this manner transient phenomenon is substantially reduced in turning on said first VMOS transistor at a time when said first bipolar switch is partially conducting.

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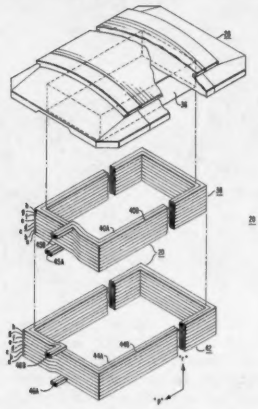
**4,303,842**

## HYDROGENERATOR WITH AN INTERNALLY COOLED ROTOR WINDING OF SALIENT POLE CONSTRUCTION

**Richard D. Nathenson, Squirrel Hill, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Sep. 21, 1979, Ser. No. 77,814**
**Int. Cl.³ H02K *9/00***
**U.S. Cl. 310—64** **10 Claims**

1. A salient pole of a liquid cooled rotor for a dynamoelectric machine, said pole including: a pole cap; punchings; a winding, said winding having concentric inner and outer helices of conductor, said helices being wound in mutually opposite directions, said conductor having a central bore extending the length of the conductor, through which coolant is circulated to cool said winding, each of said helices comprises a plurality of concentric layers, each of said layers within a single helix comprises a predetermined number of helical turns of conductor, each of said turns comprising a skewed section, said skewed section extending into an adjacent turn, a bottom lead-out, and a top lead-out; and means for accessing each of said lead-outs, whereby access to the lead-outs of both the inner and outer helix is made possible; said top lead-out of said inner helix being proximate said top lead-out of said outer helix; said bottom lead-out of said inner helix being proximate said bottom lead-out of said outer helix; said top lead-outs



being interconnectable; and said bottom lead-outs each being connectable to external fluid connections.

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**4,303,843**

## MULTIPLE MAGNETIC FLYWHEEL DRIVEN BY A CENTRIFUGAL CLUTCH

**Daniel Arnoux, St Germain en Laye; Gerard Koehler, Ville d'Avray; Andre Leconte, Le Vezinet; Claude Genter, Paris, and Bernard Michel, Conflans St Honorine, all of France, assignors to Societe Chauvin Arnoux, Paris, France**

**Filed Jul. 17, 1980, Ser. No. 169,778**
**Claims priority, application France, Jul. 18, 1979, 79 18586**
**Int. Cl.³ H02K *21/22***
**U.S. Cl. 310—67 R** **4 Claims**

1. In a multipole magnetic flywheel for a hand-driven magneto megohmmeter with step variable voltage, comprising a rotor and a stator disposed inwardly of the rotor, said rotor including a ring made of a magnetic material and an even number of permanent magnets carried by said ring and having magnetic axes which are angularly equidistant and disposed radially with respect to the axis of rotation of the rotor, each permanent magnet having a free pole face facing towards said axis of rotation, and said stator comprising an assembly of at least four angularly equidistant magnetic circuits, each magnetic circuit having a C-shape with a central portion having a coil disposed around it, and with end portions shaped so as to form a pole surface at each end, the pole surfaces of the magnetic circuits being disposed on a cylindrical surface situated close to the free pole faces of the permanent magnets, the improvement consisting in that the number p of pairs of permanent magnets is one less than the number n of magnetic circuits, and the angular distance between the pole surfaces of one

magnetic circuit is substantially equal to the angular distance between two adjacent permanent magnets, whereby the angular distance between two adjacent pole surfaces of two adjacent magnetic circuits is smaller than the angular distance between two adjacent permanent magnets, and the arc of each pole surface of a magnetic circuit is substantially equal to half the angular distance between two adjacent permanent magnets.

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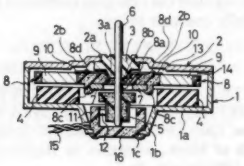
**4,303,844**

## SMALL D.C. MOTOR

**Tadashi Suzuki, 6-3, Aza-Uramachi, Kakuda, Kakuda-shi, Miyagi-ken, Japan**

**Filed Aug. 27, 1979, Ser. No. 70,127**
**Claims priority, application Japan, Aug. 31, 1978, 53-119621**
**Int. Cl.³ H02K *23/04***
**U.S. Cl. 310—154** **8 Claims**



1. A motor including
a substantially cylindrical housing made from a magnetic material;
a rotor member mounted within said housing and having a plurality of coils formed therein;
a rotary shaft held to a center portion of said rotor member;
a permanent magnet fixed in said housing and spaced from one surface of said rotor member;
a magnetic element held concentrically to the other surface of said rotor member;
a thrust bearing secured adjacent said permanent magnet to said housing and adapted to receive an end portion of said rotory shaft; and
the wall portion of said housing adjacent said magnetic element having a raised portion formed therein adjacent to said magnetic element.

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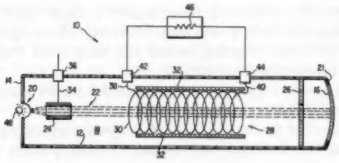
**4,303,845**

## THERMIONIC ELECTRIC CONVERTER

**Edwin D. Davis, 330 N. Clyde Morris Blvd., Daytona Beach, Fla. 32014**

**Filed Apr. 24, 1979, Ser. No. 33,025**
**Int. Cl.³ H01J *45/00***
**U.S. Cl. 310—306** **11 Claims**



1. Apparatus for converting heat energy directly into electrical energy comprising:
(a) a cathode element having an electron emissive surface for emitting electrons in response to the application of heat energy to said surface;
(b) a collecting element maintained at a positive electrical potential with respect to said cathode element for attracting, accelerating and collecting said electrons;
(c) an induction assembly comprised of a helical coil having a longitudinal axis and means for producing a stationary transversely oriented magnetic field in the interior region of said coil;
(d) an evacuated elongated container for fixedly housing said cathode element at a first end, and said collecting element at a second end, and said induction assembly at an intermediate location therein;
(e) whereby said emitted electrons in accelerated transit towards said collecting element are caused to pass through said coil interior region therein individually exhibiting a minute oscillatory magnetic field action thus giving rise to an induced EMF in said coil.

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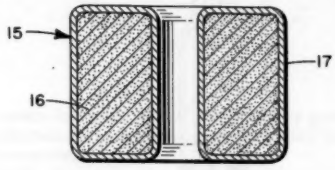
**4,303,846**

## SINTERED ELECTRODE IN A DISCHARGE TUBE

**Sakae Kimura, Yokota; Masahiro Shimura, Yokohama; Kenji Enokida, Yokosuka, and Hideharu Nihei, Yokohama, all of Japan, assignors to Toshiba Corporation, Kawasaki, Japan**

**Filed Jan. 16, 1980, Ser. No. 112,452**
**Claims priority, application Japan, Jan. 22, 1979, 54-4765**
**Int. Cl.³ H01J *61/04, 61/26***
**U.S. Cl. 313—178** **5 Claims**



1. A sintered electrode in a discharge tube comprising:
a sintered compact body including a high melting point metal, a gas getter and an additive for sintering; and
a cesium carbonate compound layer deposited on said sintered compact body.

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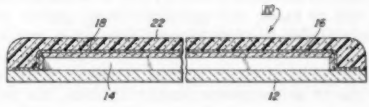
**4,303,847**

## FLAT-PANEL DISPLAY WITH GAS-IMPERVIOUS METALLIC SHEET FORMING PART OF SEALED ENCLOSURE

**David Glaser, Wilton Manors, Fla., assignor to Lucitron, Inc., Northbrook, Ill.**

**Filed Jun. 22, 1979, Ser. No. 51,152**
**Int. Cl.³ H01J *61/06, 61/30***
**U.S. Cl. 313—217** **18 Claims**



1. A flat-panel display, comprising
a self-supporting, gas-impervious, rigid glass pane having a peripheral portion surrounding a viewing area therein,
an electrode display structure positioned adjacent said viewing area of said pane,
a gas-impervious metallic rear sheet overlying said electrode structure,
sealing means hermetically sealing said rear sheet to said peripheral portion of said pane throughout a continuous area surrounding said viewing area to provide between said pane and said rear sheet a completely enclosed cavity in which said electrode structure is located,
the pressure within said cavity being less than the pressure on the external side of said sheet, and
said rear sheet being in force transmitting relationship with

said electrode structure and sufficiently soft and malleable so as to be deformed and pressed toward said pane by the differential pressure across said sheet to exert a force on said electrode structure to press said electrode structure against said pane.

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**4,303,848**

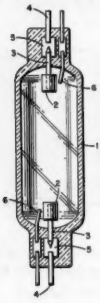
## DISCHARGE LAMP AND METHOD OF MAKING SAME

**Kenichi Shimizu, Fujisawa; Akihiro Kamiya, Yokosuka; Shu Yamazaki, Yokohama; Riozo Akiyama, Yojosuka; Teruji Makuuchi, Yokohama, and Shiichiro Yoshizaki, Tokyo, all of Japan, assignors to Toshiba Corporation, Kawasaki, Japan**

**Filed Aug. 29, 1979, Ser. No. 70,707**

**Int. Cl.³ H01J *1/14, 19/06;* H01K *1/04***

**U.S. Cl. 313—346 R** **6 Claims**



**1**. A discharge lamp comprising a sintered electrode comprising a high temperature melting metal selected from the group consisting of tungsten, molybdenum, tantalum and mixtures thereof as a main component and at least one oxide of a metal selected from the group consisting of yttrium, zirconium, aluminum and mixtures thereof, said oxide comprising from about 3% to about 30% by weight of said sintered electrode, and an alkaline earth metal compound as an electron emitting material sintered together with said high temperature melting metal and said oxide, said alkaline earth metal compound comprising from about 5% to about 40% by weight of said sintered electrode.

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**4,303,849**

## PROCESS AND APPARATUS FOR CHARGING A CAPACITOR AND APPLICATION OF THE PROCESS

**Simon Goede, Wetzikon, and Kurt Fischer, Uster, both of Switzerland, assignors to Zellweger Uster Limited, Uster, Switzerland**

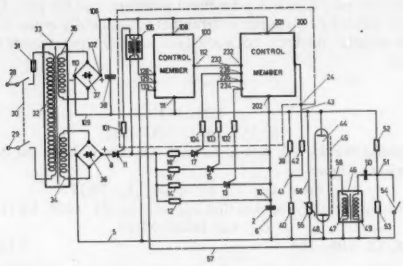
**Filed Dec. 18, 1979, Ser. No. 104,715**

**Claims priority, application Switzerland, Feb. 2, 1979, 1031/79**

**Int. Cl.³ H05B *41/32;* H02J *15/00***

**U.S. Cl. 315—241 P** **14 Claims**

**1**. Apparatus for charging a capacitor comprising a source of direct current, a primary switch, variable impedance means connected in series with said primary switch across said capacitor, first control means responsive to the terminal voltage of said capacitor for closing said primary switch, and second control means responsive to the terminal voltage of said capacitor for controlling the impedance of said variable impedance




means so as to regulate the charging current of the capacitor to be a substantially constant value.

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**4,303,850**

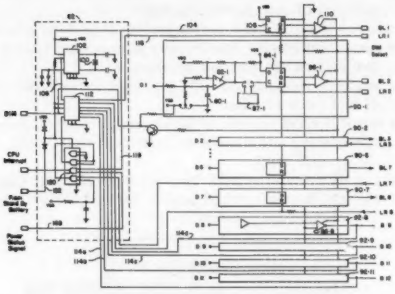
## REAL TIME CLOCK USING COMPUTER AND SEPARATE COUNTING MEANS

**John E. Juhasz, Lake Orion, and James E. Krass, Jr., St. Clair Shores, both of Mich., assignors to Rockwell International Corporation, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 881,223, Feb. 27, 1978, abandoned. This application Mar. 14, 1979, Ser. No. 20,279**

**Int. Cl.³ G06M *3/12***

**U.S. Cl. 235—92 FP** **7 Claims**



**1**. A real time clock circuit for use with an electronic computing apparatus having a central processing unit (CPU) and a memory storage means including a real time clock register comprising:

(a) means for generating first frequency clock signals;

(b) means for feeding said first frequency clock signals into said CPU for counting in said real time clock register of said memory storage means;

(c) first power supply means connected for providing power to said CPU for operating same;

(d) means for generating second frequency clock signals;

(e) means for counting said second frequency clock signals;

(f) second power supply means, independent of said first power supply means, connected to said second frequency counting means for powering same, whereby said second frequency counting means counts said second frequency clock signals independently of said first power supply means;

(g) means for disconnecting said first power supply means from said CPU;

(h) means for reconnecting said first power supply means to said CPU after a time interval;

(i) said second frequency counting means counting said second frequency clock signals during said time interval;

(j) means for inhibiting counting of said second frequency counting means while said real time clock register is counting said first frequency clock signals;

(k) means for incrementing said real time clock register in proportion to the counts accumulated in said second frequency counting means during said time interval,

whereby said real time clock register is updated to account for first frequency clock signals not counted during said time interval.

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**4,303,851**

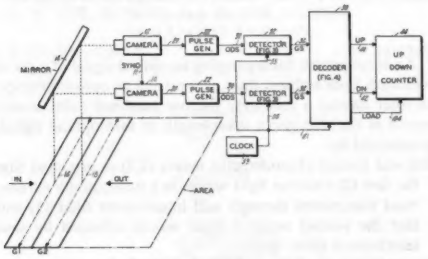
## PEOPLE AND OBJECT COUNTING SYSTEM

**Francois M. Mottier, South Windsor, Conn., assignor to Otis Elevator Company, Hartford, Conn.**

**Filed Oct. 16, 1979, Ser. No. 85,455**

**Int. Cl.³ G06M *3/14;* G07C *9/00***

**U.S. Cl. 235—92 PK** **6 Claims**




1. An apparatus for counting objects and people in an area, comprising:

means for viewing the area perimeter along an inner and an outer path so that objects and people are seen as they pass over portions of the paths in a sequence manifesting if they are entering or leaving the area, said means generating successive object detection signals for each path, in a sequence that manifests the position of the objects and people and having a duration corresponding to the actual space in the path occupied by the objects and people to which they correspond;

means for generating a path signature for each path from its corresponding object detection signals, said signature consisting of sequential gate signals that manifest a gate area of predetermined space along each path at the location therein of an object or person occupying a minimum predetermined path space;

means for comparing successive path signatures in a manner for detecting changes in successive gate signals according to a predetermined sequence that manifests the sequential movement associated with an object or person passing through adjacent corresponding spaces in the inner and outer paths to enter or leave the area; said means generating, from said comparison, an up count signal each time there is movement across said corresponding path spaces in a direction entering the area and a down count each time there is movement in a direction leaving the area; and

a counter, responsive to said up and down count signals, for maintaining a net count that reflects the instantaneous number of people and objects in the area.

**4,303,852**

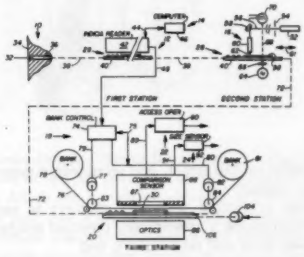
## ACCESS SECURITY CONTROL

**Daniel Silverman, 5969 S. Birmingham Ave., Tulsa, Okla. 74105, and Everett A. Johnson, 15 S. Prospect Ave., Park Ridge, Ill. 60068**

**Continuation-in-part of Ser. No. 752,912, Dec. 21, 1976, Pat. No. 4,150,781, which is a continuation-in-part of Ser. No. 495,632, Aug. 8, 1974, Pat. No. 3,999,042, which is a continuation-in-part of Ser. No. 272,739, Jul. 18, 1972, Pat. No. 3,829,661, which is a continuation-in-part of Ser. No. 74,066, Sep. 21, 1970, Pat. No. 3,677,465. This application Apr. 23, 1979, Ser. No. 32,404**

**Int. Cl.³ G06K *5/00, 7/10;* G08B *29/00***

**U.S. Cl. 235—382** **10 Claims**




1. A system for access control, for selectively granting access on presentation and authentication of a control token, said system comprising:

A. a bank comprising

(1) storage means for storing a plurality of unique authenticating master coded bit patterns, each in different address locations;

(2) a plurality of address locations in said storage means, each address being an index of the bit pattern stored therein;

B. a plurality of control tokens, each control token comprising

(1) an unique object;

(2) means on said object for storing in machine readable form an unique index;

(3) means on said object for storing in machine readable and machine writeable form an unique coded bit pattern;

(4) each of said control tokens having one of said unique indicia and the corresponding unique authenticating coded bit patterns stored in said bank;

C. reading means to which a control token can be presented, said reading means including first means to read said indicium, and second means to read said coded bit pattern on said token;

D. means responsive to said first means to select from said bank said coded bit pattern corresponding to said indicium; and

E. means to compare the unique bit pattern read from said token with the stored bit pattern in said bank corresponding to the read indicium.

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**4,303,853**

## METHOD OF AND APPARATUS FOR DETERMINING THE IMPACT SITE OF A BULLET UPON A TARGET

**Claude Thalmann, Muri, Switzerland, assignor to Polytronic AG, Muri, Switzerland**

**Filed Nov. 20, 1979, Ser. No. 96,225**

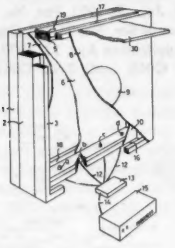
**Claims priority, application Switzerland, Nov. 22, 1978, 11986/78; Nov. 22, 1978, 11987/78; Jan. 23, 1979, 694/79**

**Int. Cl.³ F41J *5/12;* G06F *15/20***

**U.S. Cl. 235—400** **8 Claims**

3. A target assembly comprising:

a first layer formed with a target image and constituting an impact surface traversed by a bullet;
a frame disposed behind said layer and formed with front and back covers while defining a chamber;
a plurality of sensors mounted in said chamber at predetermined spaced-apart locations for generating electrical signals in time-staggered relationship upon impact of a



bullet on the target, said relationship determining the site of impact;
means connected with and effective in said chamber for maintaining a substantially constant temperature between said layer and said sensors; and
means connected to said sensors for evaluating the outputs thereof to indicate the site of impact.

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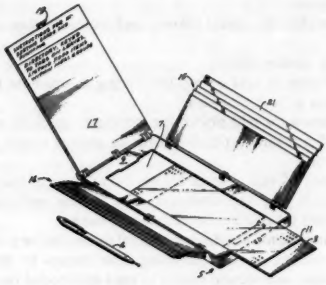
**4,303,854**

## DIETARY AID FOR ACCUMULATING MACHINE READABLE INFORMATION

**David H. Blankenhorn, 1165 Afton St., Pasadena, Calif. 91103**

**Continuation-in-part of Ser. No. 448,494, Mar. 9, 1974, Pat. No. 3,980,866. This application Jul. 12, 1976, Ser. No. 704,447**
**Int. Cl.³ G06K *19/06, 19/00***
**U.S. Cl. 235—492** **9 Claims**



1. Apparatus adapted to cooperate with a machine readable record member for accumulating a dietary journal, the record member having a plurality of spaced-apart entry locations at each of which digitally encoded oral consumption data can be entered, the apparatus comprising
means releasably holding the record member;
a plurality of displays, each display including at least one item representation of an item for oral consumption and, in association with each item representation, indicia describing discrete selectable quantities of the represented item, each item representation corresponding to a different one of the entry locations and comprising a written description of the represented item and a picture illustrating both the nature of the represented item and a unit quantity thereof; and
means arranging the displays for one-by-one exhibition and operative to expose in registration with each exhibited display each of the entry locations corresponding to the item representations so as to facilitate the entry of digitally encoded food consumption data at the exposed entry locations.

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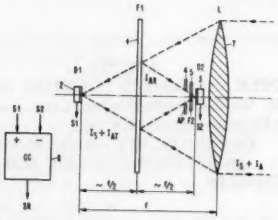
**4,303,855**

## SYSTEM FOR SEPARATING AN OPTICAL SIGNAL FROM AMBIENT LIGHT

**Urs H. Bapst, Zurich; Fritz Gfeller, Adliswil, and Peter Vettiger, Langnau, all of Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 6, 1979, Ser. No. 101,330**
**Claims priority, application Switzerland, Dec. 20, 1978, 12923/78**
**Int. Cl.³ C01J *3/34***
**U.S. Cl. 250—226** **8 Claims**



1. An arrangement for separating an optical signal of a given wavelength from ambient light, comprising an optical interference filter having a relatively narrow passband substantially centered at the said given wavelength of said optical signal, characterized by
first and second photodetector means (2,3) so arranged that the first (2) receives light waves in a substantially narrow band transmitted through said interference filter (1) and that the second receives light waves reflected by said interference filter, and
circuit means (6, FIG. 1; FIG. 4; FIG. 5) for generating a difference signal (SR) from the output signals (S1, S2) of said
first and second photodetector means, and means (4, 5, FIG. 1; 19, FIG. 5) for adjusting the relation between the output signals furnished by the said first and second photodetector means.

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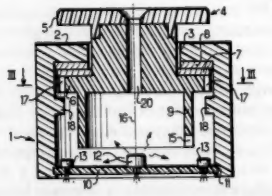
**4,303,856**

## CONTROL PUSH-BUTTON DEVICE FOR SWITCHING AN ELECTRONIC OR ELECTRIC CIRCUIT

**Edouard Serras-Paulet, Casa Nostra-Pech des Treilles, 82240 Puylaroque, France**

**Continuation-in-part of Ser. No. 678,743, Apr. 21, 1976, abandoned. This application Jan. 25, 1978, Ser. No. 872,460**
**Claims priority, application France, May 25, 1977, 77 15937**
**Int. Cl.³ G01D *5/34***
**U.S. Cl. 250—229** **12 Claims**



1. A push-button switch, comprising a casing provided with an opening, a push-button movable through said opening be-

tween a first and a second end positions in the casing, a plate of insulating material forming a wall of the casing and carrying at least one switching means adapted to pass from a first conduction state to a second conduction state when submitted to a magnetic field, at least an element of magnetic material secured to said casing, and at least a permanent magnet carried by said push-button for controlling the conduction state of the switching means when the push-button is in its second end position and for forming with said element of magnetic material magnetic return means for returning the push-button it its first end position.

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**4,303,857**

## AUTOMATIC THERMOLUMINESCENCE DOSIMETRIC SYSTEM

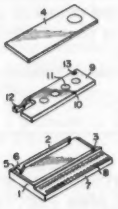
**Isamu Inoue, Neyagawa; Seiko Minamide, Nara, and Makoto Okuda, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd.,, Osaka, Japan**

**Filed Jun. 19, 1979, Ser. No. 49,907**

**Claims priority, application Japan, Jun. 29, 1978, 53/79312; Jun. 29, 1978, 53/79313; Jun. 29, 1978, 53/79314**

**Int. Cl.³ G01T *1/00, 1/11***

**U.S. Cl. 250—328** **11 Claims**



1. An automatic thermo-luminescence dosimeter comprising:

at least one thermo-luminescence dosimeter element including a card carrying a thermo-luminescence material, said card being contained within an encasing member;

a magazine adapted to accommodate therein a plurality of said thermo-luminescence dosimeter elements;

means for transporting said magazine to a predetermined position;

dosimeter element feeding means for extracting one of said thermoluminescence dosimeter elements from said magazine and feeding said element into a longitudinal groove formed in a housing;

releasing means for releasing engagement between the card and encasing member of said one dosimeter element;

card feeding means for taking the card from the encasing member of said one dosimeter element and feeding said card into a transversal groove formed in said housing;

heating means for heating said thermo-luminescence material carried by the card fed to said transversal groove by irradiating said material with infrared rays; and

photoelectric converter means for converting the thermo-luminescence emitted by said thermo-luminescence material into an electric signal, said card feeding means returning said card to said encasing member and said dosimetric element feeding means returning said encasing member and card to said magazine after measurement of said thermo-luminescence element by said photoelectric converter.

**4,303,858**

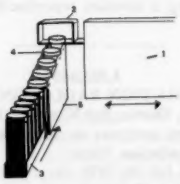
## DEVICE TO BE USED IN AUTOMATIC GAMMA COUNTERS TO MOVE THE SAMPLES INTO A MEASURING CHAMBER

**Jan Östrup, Kaarina, Finland, assignor to Wallac Oy, Turku, Finland**

**Filed Dec. 18, 1979, Ser. No. 104,762**

**Int. Cl.³ G01T *1/00*; G01N *23/00***

**U.S. Cl. 250—328** **3 Claims**



1. In an automatic gamma counter for measuring radioactive samples contained in sample holders removably supported in elongated racks which are moved step-by-step in a longitudinally directional path past a measuring station comprising:

a radiation shielded chamber disposed at said station on one side of said path, said chamber having an opening facing a sample holder positioned at said station through which sample holders are to be sequentially introduced into the chamber for measuring;

a slide fabricated of radiation shielding material mounted at said station on the opposite side of said path and facing said opening for horizontal reciprocating movement perpendicular to said path between a retracted position on the side of the path opposite from said opening and a projected position in engagement with said opening;

said slide having a configuration to engage with said opening in said projected position to provide a radiation shielded closure for said chamber; and

transferring and gripping means for removing a sample holder from a rack at said station when the slide is in said retracted position and for suspending the removed holder in said shielded chamber when in said projected position.

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**4,303,859**

## INFRA-RED ANALYSIS APPARATUS AND METHOD

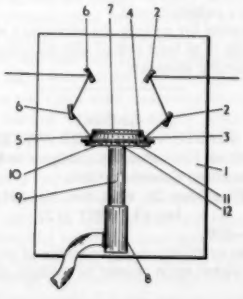
**John McCue, Edinburgh, Scotland, assignor to Coal Industry (Patents) Limited, London, England**

**Filed Jan. 3, 1980, Ser. No. 109,243**

**Claims priority, application United Kingdom, Jan. 9, 1979, 00706/79**

**Int. Cl.³ G01J *1/00*; G01N *21/00***

**U.S. Cl. 250—338** **7 Claims**



1. An IR attenuated total reflection apparatus capable of

reproducible quantitative analysis of crystalline silica in airborne dust, said apparatus comprising a planar crystal ATR prism having a smaller major face and a larger major face and edges, one pair of edges being bevelled and capable of acting as entry and exit faces for an IR beam, a prism support, a beam reflection system for transmitting an IR beam into and from the edges of said prism, and pressure means for bringing a planar sample into contact with the larger major face of the prism and for applying a constant reproducible predetermined pressure thereto, the contact of said larger major face of the prism with the sample defining a constant reproducible sample area for analysis.

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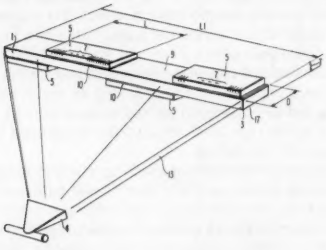
**4,303,860**

## HIGH RESOLUTION RADIATION DETECTOR

**Paul J. Bjorkholm, Sharon, and Victor M. Benveniste, Magnolia, both of Mass., assignors to American Science and Engineering, Inc., Cambridge, Mass.**

**Filed Jul. 30, 1979, Ser. No. 61,739**
**Int. Cl.³ G01T** *1/20, 1/24*
**U.S. Cl. 250—363 S** **12 Claims**



1. A high resolution radiation detecting apparatus for generating electrical signals representative of the intensity of incident primary radiation, the apparatus comprising:

at least one scintillation crystal for receiving primary radiation and generating corresponding secondary radiation, said at least one scintillation crystal including a front face for receiving incident primary radiation, a back face opposite said front face and top and bottom emission faces for emitting at least a portion of said secondary radiation, the distance between said front and back faces being sufficiently great to allow a desired portion of said primary radiation to be stopped by said at least one scintillation crystal, and the distance between said top and bottom emission faces being sufficiently small to minimize the scattering of said secondary radiation within said scintillation crystal before the secondary radiation is emitted from the crystal;

detector means including a plurality of radiation detecting elements, each element having means for generating an electrical signal representative of the intensity of incident secondary radiation; and

coupling means for passing the secondary radiation emitted from areas of at least one of said emission faces to associated detecting elements.

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**4,303,861**

## PHOTON DETECTOR SYSTEM

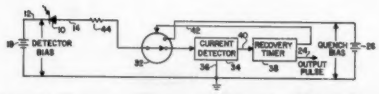
**Philip A. Ekstrom, Lexington, Ky., assignor to Battelle Development Corporation, Columbus, Ohio**

**Filed Mar. 28, 1980, Ser. No. 134,846**
**Int. Cl.³ G01T** *1/22*
**U.S. Cl. 250—370** **17 Claims**

1. A photon detection system capable of providing an electrical output signal upon receipt of a single photon, comprising:

a semiconductor device including a pair of electrical leads connected thereto, said device exhibiting avalanche breakdown when one or more free charge carriers are present therein and an electrical potential in excess of a predetermined avalanche potential is placed across said pair of electrical leads,

biasing means for applying an electrical potential across said pair of electrical leads in excess of said predetermined avalanche potential,




cooling means for cryogenic cooling of said semiconductor device such that thermally generated charge carriers within said device are substantially eliminated, whereby avalanche breakdown occurs as a result of free charge carriers produced by photon absorption by said semiconductor device, and

means for sensing avalanche breakdown of said semiconductor device and for producing said electrical output signal in response thereto.

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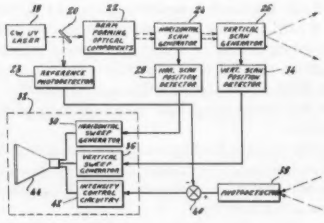
**4,303,862**

## CLEAR AIR TURBULENCE DETECTOR

**Allen R. Geiger, 2600 E. Idaho #227, Las Cruces, N. Mex.**

**Filed Jul. 18, 1979, Ser. No. 58,505**
**Int. Cl.³ G01J** *1/42·* **G01N** *21/00*
**U.S. Cl. 250—372** **11 Claims**




1. A system for use in an aircraft in flight for detecting clear air turbulence in a predetermined area along the aircraft's flight path comprising:

a laser device for providing a coherent beam of optical radiation having a wavelength in the ultraviolet region;

horizontal and vertical scan generator means for directing the coherent beam through a predetermined area in the aircraft's flight path which clear air turbulence is to be detected;

a photodetector for detecting optical radiation backscattered from the predetermined area to produce electrical signals proportional to the intensity of the backscattered radiation; and

display means connected to said photodetector and operat-

ing in synchronism with said horizontal and vertical scan generator means for providing a visual display of the intensity of backscattered radiation over the predetermined area, turbulence being indicated by nonuniformities in the visual display.

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**4,303,863**

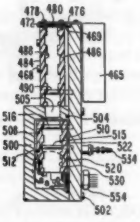
## TOMOGRAPHIC SCANNING APPARATUS WITH IONIZATION DETECTOR MEANS

**Janos A. Racz, San Jose, and Edward J. Seppi, Menlo Park, both of Calif., assignors to General Electric Company, Milwaukee, Wis.**

**Division of Ser. No. 917,443, Jun. 20, 1978, Pat. No. 4,217,498. This application Oct. 4, 1979, Ser. No. 81,973**

**Int. Cl.³ H01J** *39/28;* **G01N** *21/52*

**U.S. Cl. 250—385** **6 Claims**




1. A multicell radiation detector comprising:

a chamber for gas that produces electron-ion pairs incidental to absorbing radiation,

first and second insulating members and means for supporting said members in precise spaced apart relationship within said chamber,

said first and second insulating members each having a side in which there is a plurality of grooves, said members being supported for their grooved sides to face each other,

a plurality of electrode plate means secured in juxtaposed spaced apart relationship by having their opposed edges engaged in corresponding grooves in said members, respectively, the spaces between said plate means constituting cells for being occupied by said gas, and

means for establishing electric circuits from said plate means to the exterior of said chamber.

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**4,303,864**

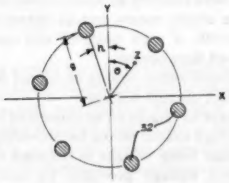
## SEXTUPOLE SYSTEM FOR THE CORRECTION OF SPHERICAL ABERRATION

**Albert V. Crewe, Palos Park, and David A. Kopf, Chicago, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Oct. 25, 1979, Ser. No. 88,224**

**Int. Cl.³ G21K** *1/08;* **H01J** *3/14, 3/26*

**U.S. Cl. 250—396 R** **4 Claims**




1. In an electron beam device having a source of electrons, the improvement in the device for correcting spherical aberration, comprising: a first lens for focusing the beam to a point, a sextupole for focusing a beam in an image plane having a third order, spherical aberration, the point being at the center of said sextupole, and a second lens positioned at the image plane of said sextupole for focusing the beam to a point in an image plane.

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**4,303,865**

## COLD CATHODE ION SOURCE

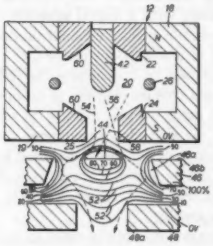
**Donald L. Swingler, Park Orchards, Australia, assignor to Commonwealth Scientific & Industrial Research Organization, Campbell, Australia**

**Filed Aug. 24, 1979, Ser. No. 69,409**

**Claims priority, application Australia, Aug. 25, 1978, PD5679; Apr. 26, 1979, PD8542**

**Int. Cl.³ H01J** *27/00*

**U.S. Cl. 250—423 R** **9 Claims**



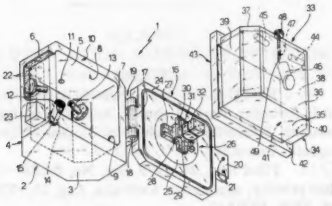

1. An ion source for generating ions of a gas or vapour and comprising two cathodes spaced apart on the axis of the source, an anode interposed between the cathodes, said anode being of generally annular cross-section transverse to said axis, and magnet means for generating a magnetic field aligned in the direction of said axis and extending between said cathodes, said cathodes defining therebetween a space within which said anode is positioned and into which gas or vapour is introduced for generation of said ions, one of said cathodes being apertured for exit therethrough of said ions from said space; said ion source further comprising a first electrode, a second electrode and a third electrode, said first electrode being positioned on said axis adjacent said one cathode so that said one cathode is between said first electrode and said space, said second electrode having an axially aligned first aperture and being positioned adjacent said first electrode to define therewith a generally annular opening between the peripheries of said first electrode and said first aperture, said third electrode being disposed axially away from said second electrode and farther away from said space than is said second electrode, said third electrode having a second axially aligned aperture therein, whereby, upon application to said first and second electrodes of a positive potential and to said third electrode of a potential which is negative relative to that applied to said second electrode, there is created an electrostatic field at or around said first electrode and between said second and third electrodes and directed so as to cause high energy negative ions exiting from said opening to hit the first electrode and so as to cause low energy negative ions around said first electrode to be deflected through said first aperture and thence through said second aperture.

**4,303,866**

## METHOD AND DEVICE FOR MOUNTING PIECES INSIDE THE VACUUM CHAMBER OF AN ELECTRON MICROSCOPE

**Francesco Porro, Gallarate; Cosimo Gabriele, Busto, both of Italy, and Walter Hotz, Beringen, Switzerland, assignors to Costruzioni Aeronautiche Giovanni Agusta S.p.A., Varese, Italy**

**Filed May 29, 1980, Ser. No. 154,211**
**Claims priority, application Italy, Jun. 12, 1979, 68259 A/79**
**Int. Cl.³ G21K *5/10***
**U.S. Cl. 250—442** **2 Claims**



1. A method for mounting pieces inside the vacuum chamber of an electron microscope, said chamber comprising a fixed cup-shaped body with a lateral aperture closed in an airtight manner by a mobile closure element supporting a piece holder, and detection means disposed inside said chamber; the method being characterised by comprising the following stages:

disposing said closure element in an open position;

mounting a piece for observation on said piece holder;

positioning on said closure element a rigid mask made of transparent material and constituted by a cup-shaped body having a cavity which is identical in shape and dimensions to that of said fixed cup-shape body provided with said detection means;

adjusting the position of the piece to be observed to bring it into the correct position for initiating observations;

moving the closure element into its closed position after removing said mask.

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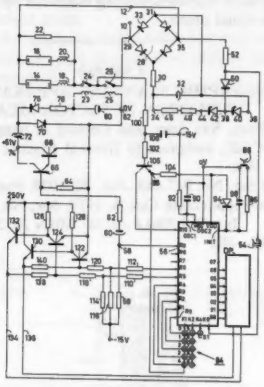
**4,303,867**

## DOMESTIC APPLIANCE COMPRISING A PROTECTED PROGRAMMING DEVICE

**Andries van der Meulen, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Dec. 10, 1979, Ser. No. 101,973**
**Claims priority, application Netherlands, Dec. 14, 1978, 7812150**
**Int. Cl.³ H05B *37/02, 41/36***
**U.S. Cl. 315—360** **9 Claims**

1. A domestic appliance comprising, a power supply terminal, a generator tube for generating electromagnetic radiation, first switching means connected in series with the generator tube to said supply terminal, and a programming device which comprises an input for receiving on-time information and a subsequent start signal, an output for supplying an activation signal for the first switching means, updating means for updating the on-time yet to be completed, and first detection means for detecting said updating and for generating, in the case of a failure therein, an error signal in order to deactivate said activation signal, and wherein said updating means comprise a signal output for supplying a periodic signal during said on-time for continuous reactivation of said activation signal, the



activation signal disappearing if said periodic signal does not appear.

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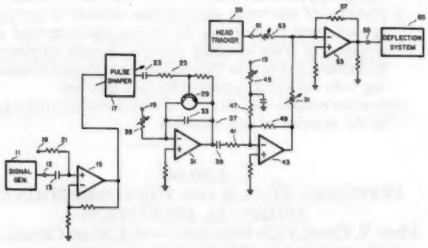
**4,303,868**

## SAWTOOTH WAVEFORM GENERATING CIRCUIT FOR UTILIZATION IN A HELMET MOUNTED DISPLAY

**Herbert Berke, Maitland; John H. Allen, Winter Park, and Joseph R. Owen, Orlando, all of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jul. 10, 1980, Ser. No. 167,275**
**Int. Cl.³ H01J *29/70, 29/72***
**U.S. Cl. 315—364** **13 Claims**




1. A sawtooth waveform generating circuit for utilization in a helmet mounted display comprising, in combination:

pulse source means having an output for generating a sync signal having a series of uniformly spaced pulses, the frequency of which is a predetermined value;

pulse shaping means having an input connected to the output of said pulse source means and an output for narrowing the pulse width of each pulse of said sync signal to a predetermined time period;

first voltage source means having an output for generating a constant direct current voltage;

integrating means having an input connected to the output of said first voltage source means for providing at the output thereof a linear ramp voltage in response to the constant direct current voltage provided by said first voltage source means, said linear ramp voltage having a predetermined maximum amplitude;

switching means having a first terminal connected to the output of said pulse shaping means, a second terminal connected to the input of said integrating means, and a

third terminal connected to the output of said integrating means for shorting said integrating means each time one of the pulses of said sync signal is applied to the first terminal thereof such that said linear ramp voltage will drop to a predetermined minimum amplitude so as to form a sawtooth waveform signal, said sawtooth waveform signal having a frequency identical to the frequency of said sync signal, and a direct current component therein;

coupling means having an input connected to the output of said switching means and an output for removing the direct current component from said sawtooth waveform signal;

means having a first input connected to the output of said coupling means, a second input connected to the output of said first voltage source means, and an output for variably shifting the voltage level of said sawtooth waveform signal;

second voltage source means having an output for providing a variable direct current voltage; and

summing means having a first input connected to the output of said voltage level shifting means, a second input connected to the output of said second voltage source means, and an output for amplifying said sawtooth waveform signal, and for combining said amplified sawtooth waveform signal and the variable direct current voltage provided by said second voltage source means so as to form a raster drive signal at the output thereof.

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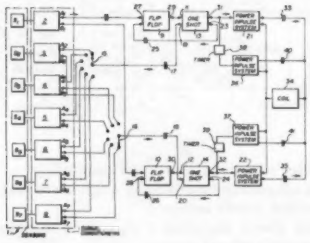
**4,303,869**

## CONTROL CIRCUIT FOR ELECTROMAGNETIC APPARATUS

**Miroslav Baran, Trenton, Canada, assignor to Bata Shoe Company, Inc., Belcamp, Md.**

**Filed Jul. 12, 1979, Ser. No. 57,079**
**Claims priority, application Canada, Jul. 14, 1978, 307385**
**Int. Cl.³ H02K *33/00***
**U.S. Cl. 318—130** **3 Claims**



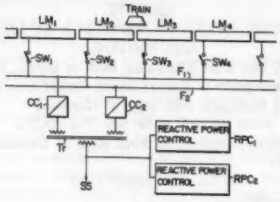
1. A control circuit for use in a reciprocating electromagnetic apparatus of the type including a plunger, a core on the plunger and a coil surrounding the core for driving the plunger, the control circuit comprising at least one normally charged primary condenser means connected to said coil for energizing the coil; means for instantaneously discharging said primary condenser means into said coil; at least one normally charged auxiliary condenser means connected to said coil for energizing the coil; and timer means connected to said discharging means and to said auxiliary condenser means for causing said auxiliary condenser means to discharge into said coil after said primary condenser means.

**4,303,870**

## POWER SUPPLY SYSTEM FOR LINEAR MOTOR

**Kiyoshi Nakamura, Katsuta; Masayoshi Isaka, Hitachi; Yoshimi Kurotaki, Katsuta, and Yutaka Suzuki, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Aug. 7, 1979, Ser. No. 64,361**
**Claims priority, application Japan, Aug. 12, 1978, 53-97793**
**Int. Cl.³ H02K *41/00***
**U.S. Cl. 318—135** **2 Claims**




1. A power supply system for a long-stator linear motor, the stationary long stator of which comprises a plurality of sections arranged along a path, said sections each being connectable to a converter means in accordance with the position of a vehicle moved relative to said sections along said path, said converter means providing a frequency-controllable polyphase output to each section when a movable portion of the linear motor fixed to the vehicle is disposed in the region of each such section to move said vehicle along said path, wherein at the input side of said converter means there are provided, first and second reactive power compensation means which are connected in parallel to one another, the capacitance of each of said first and second reactive power compensation means being controlled in accordance with a signal corresponding to a value of reactive power required for feeding said stationary long stator to move said vehicle, said first reactive power compensation means being constantly turned on, said second reactive power compensation means being capable of being turned on in accordance with the movement of the vehicle when two long-stator sections are turned on simultaneously.

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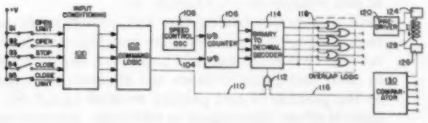
**4,303,871**

## NUTATING MOTOR CURRENT CONTROL

**Eddie T. Berry, Renton, Wash., assignor to Morgan Actuators, Inc., Seattle, Wash.**

**Filed Mar. 10, 1980, Ser. No. 128,959**
**Int. Cl.³ H02P *6/02***
**U.S. Cl. 318—138** **12 Claims**




1. A system for controlling the current in an inductive winding of a motor, said motor operated from a power supply, comprising:

a first switch means coupled between a first terminal of the power supply and a first terminal of the winding;

a second switch means coupled between a second terminal of the power supply and a second terminal of the winding;

means for sensing the current in the winding;

comparator means coupled to the sensing means and providing an output signal indicative of the winding current exceeding a predetermined maximum level;

means for controlling the first and second switch means, said control means turning off the first and second switches in response to the indicative signal so that the winding current is limited to the predetermined maximum level; and

steering means for allowing the winding current to flow from the second terminal of the winding to the first terminal of the power supply and from the first terminal of the winding to the second terminal of the power supply while limiting the reverse emf to approximately the power supply voltage when the first and second switch means are turned off so that energy stored in the winding is returned to the power supply.

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**4,303,872**

## TELESCOPING ANTENNA MOVABLE BY MEANS OF A D.C. MOTOR

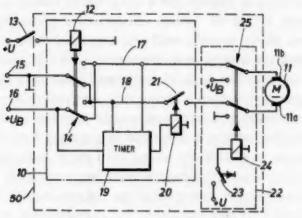
**Reinhard Alf, and Kurt Klinkwitz, both of Berlin, Fed. Rep. of Germany, assignors to Robert Bosch GmbH Geschäftsbereich Elektronik, Stuttgart, Fed. Rep. of Germany**

**Filed Jul. 13, 1979, Ser. No. 57,372**

**Claims priority, application Fed. Rep. of Germany, Jul. 21, 1978, 2832061**

**Int. Cl.³ H02P *1/00***

**U.S. Cl. 318—257** **6 Claims**




1. An antenna control system for extending and retracting a telescoping antenna for a vehicle comprising:

a d.c. motor, having first and second terminals, coupled to said antenna, said motor rotating in one direction when a voltage having one polarity is applied across its terminals thereby extending said antenna and in the reverse direction when a voltage of the opposite polarity is applied across its terminals thereby retracting said antenna;

a control device comprising,

a polarity responsive timer for closing a contact for a predetermined interval when the polarity of the voltage applied across said timer is reversed, and,

a polarity reversal switch for coupling a d.c. voltage source across the terminals of said polarity responsive timer with a selected polarity, the polarity of the voltage across said timer being determined by the position of said polarity reversal switch; and,

a switching device having first and second states, said switching device in its first state coupling said polarity reversal switch through said contact to said d.c. motor to cause said motor to rotate in a direction determined by the position of said polarity reversal switch for an interval of time determined by said timer, said switching device in its second state coupling a d.c. voltage source of selectable polarity across said motor for rotation thereof in a direction determined by the polarity of said applied d.c. voltage source.

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**4,303,873**

## RESET WINDUP LIMITING

**Royal R. Hawkins, Bloomington, Minn., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Jun. 27, 1980, Ser. No. 163,744**

**Int. Cl.³ H02P *5/16***

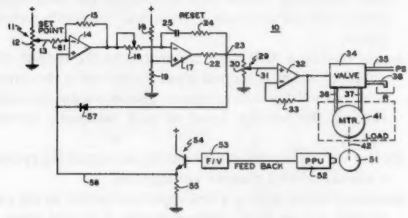
**U.S. Cl. 318—301** **16 Claims**

1. A proportional control system for controlling a condition at a setpoint, said system having reset for substantially reducing system droop and having reset windup limiting comprising:

setpoint means for establishing said setpoint for said proportional control system;

feedback means for supplying a feedback signal in accordance with said condition, said condition being controlled by a load;

reset means being connected to both said setpoint means and said feedback means for substantially reducing said system droop, said reset means having an output for supplying a reset output signal,




reset windup limiting means connected to said output of said reset means and to said feedback means so that said reset output signal is limited to a value that differs from said setpoint by a predetermined increment; and

means connected to said reset means and adapted to be connected to said load for controlling said load in accordance with said reset output signal.

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**4,303,874**

## MOTOR SPEED CONTROL SYSTEM

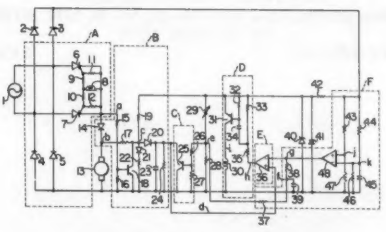
**Ryuichiro Iwai, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jun. 30, 1980, Ser. No. 164,271**

**Claims priority, application Japan, Jul. 13, 1979, 54-89530; Oct. 23, 1979, 54-137473**

**Int. Cl.³ H02P *5/16***

**U.S. Cl. 318—331** **3 Claims**



1. A motor speed control system comprising:

a motor adapted to be driven by a full-wave rectified phase controlled power supply;

a control circuit including a thyristor for controlling the energization of said motor;

a sawtooth wave generator circuit for generating a sawtooth wave by charging and discharging a first capacitor with a D.C. power supply voltage used as a velocity reference voltage, in synchronism with a power supply frequency;

an induced voltage detection circuit for detecting an induced voltage due to the rotation of said motor and storing said induced voltage on a second capacitor;

a limiter circuit for limiting the charge voltage on said second capacitor, said limiter circuit providing a limiting voltage varying with said D.C. power supply voltage;

a compare circuit for comparing the sawtooth wave from said sawtooth wave generator circuit with the voltage on

said second capacitor from said induced voltage detection circuit; and

a pulse generator circuit responsive to the output signal from said compare circuit to generate a pulse for triggering said thyristor.

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**4,303,875**

## DEVICE FOR THE REMOTE CONTROL OF THE ANGULAR POSITION OF AN AERIAL ROTOR

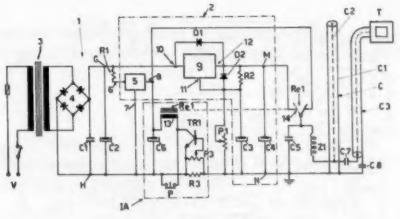
**Salvatore Montorio, Via Liberta 23-S.Donato, Milanese, Italy**

**Filed May 24, 1979, Ser. No. 41,992**

**Claims priority, application Italy, May 31, 1978, 24057 A/78**

**Int. Cl.³ G05B *1/06***

**U.S. Cl. 318—667** **6 Claims**



1. A device for remote controlling the rotational position of an aerial of a receiver by a reversible electrical d.c. motor comprising:

feeding means for generating a d.c. control voltage comprising a voltage regulator having an output voltage variable in accordance with the desired rotational position, said value being higher than a prefixed reference value;

a connection cable for conveying RF signals picked up by the aerial to the receiver, along such cable, said d.c. control voltage being simultaneously applied to a drive circuit of the d.c. motor; and

a drive circuit for said motor including means for detecting said d.c. control voltage and for recovering said d.c. reference voltage from the control voltage, the latter being a power supply voltage.

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**4,303,876**

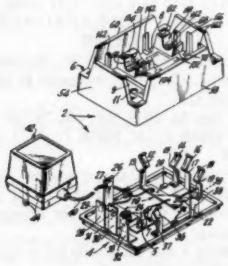
## MULTI-CELL BATTERY CHARGER

**William T. Kelly, III, West Redding, Conn., and Francis Stahl, Rocky River, Ohio, assignors to Union Carbide Corporation, New York, N.Y.**

**Filed Mar. 27, 1980, Ser. No. 134,494**

**Int. Cl.³ H02J *7/00*; H01M *10/46***

**U.S. Cl. 320—2** **12 Claims**



1. A battery charger comprising a holder having a generally rectangular base with a pair of upstanding first and second side walls, an upstanding front wall and an upstanding rear wall; a first conductive terminal contact means having a first upstanding conductive terminal member disposed adjacent to and interior of the first side wall and a second upstanding conductive terminal member disposed adjacent to and interior of the rear wall; a second conductive terminal contact means having a first upstanding conductive terminal member disposed adjacent to and interior of the second side wall and a second upstanding conductive terminal member disposed adjacent to and interior of the rear wall; a third conductive terminal contact means having two upstanding conductive terminal members disposed adjacent to and interior of the front wall; said second conductive terminal member of the first conductive terminal contact means and said second terminal member of the second conductive terminal contact means aligned substantially in the same plane and spaced apart from the conductive terminal members of the third terminal contact means by a distance to accommodate lengthwise a "D" size [about 2.25 inches (5.7 cm)] rechargeable cell in pressure contact therebetween; said first conductive terminal member of the first conductive terminal contact means disposed and spaced apart from said first conductive terminal member of the second conductive contact means by a distance to accommodate two tandem series-connected "AA" size or "C" size [about 1.8 inches (4.8 cm)] rechargeable cells in pressure contact there-between; said first conductive terminal contact means and said second conductive terminal contact means connected across a transformer and current rectifier adapted for plugging into a conventional alternating-current power supply line; the improvement wherein the first conductive terminal contact means has a first snap battery terminal disposed in the base and wherein a second snap battery terminal in electrical contact with the second conductive terminal contact means is disposed adjacent to and spaced apart from the first snap battery terminal by about 0.5 inch (about 1.07 cm) to accommodate a 9-volt rectangular rechargeable cell for charging.

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**4,303,877**

## CIRCUIT FOR PROTECTING STORAGE CELLS

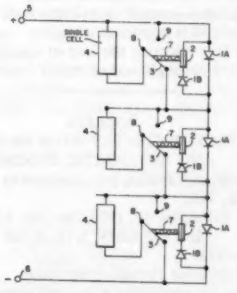
**Henner Meinhold, Sandhausen, Fed. Rep. of Germany, assignor to Brown, Boveri & Cie Aktiengesellschaft, Mannheim-Käfertal, Fed. Rep. of Germany**

**Filed May 1, 1979, Ser. No. 35,270**

**Claims priority, application Fed. Rep. of Germany, May 5, 1978, 2819584; Sep. 7, 1978, 2838996**

**Int. Cl.³ H02J *7/04***

**U.S. Cl. 320—6** **19 Claims**



1. Electrochemical storage cells of the alkali metal and chalcogen type, connected to form a battery which can be uniformly charged and discharged, in which series-connected cells having positive and negative electrodes as individual cells or groups of several parallel-connected storage cells are series-connected to form a battery having a positive terminal and a negative terminal with the cell having an anode chamber for containing alkali metal anolyte and a cathode chamber for containing chalcogen catholyte, with the anode chamber separated from the cathode chamber by an alkali ion-conducting

solid electrolyte, a protective circuit shunted across each said series-connected cell which bridges the circuit through said series-connected cell upon said series-connected cell reaching a given maximum charge or discharge, a switch conductively connectible directly to the negative and positive electrodes of said series-connected cells and to the terminals of the battery, said protective circuit in operational contact with said switch, said protective circuit connected with each cell terminals, and said series-connected cells connected to one of the two terminals of the battery via said switch and, wherein the protective circuit is formed of at least one first series-connected diode across which is shunted a series-connection comprising at least one heating element and a second diode with the first diode poled in forward direction and the second diode in blocking direction.

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**4,303,878**

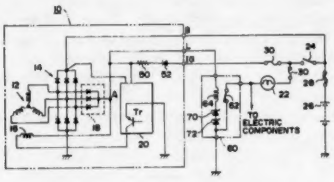
## DEVICE FOR INDICATING THE RATE OF CHARGE IN AN AC GENERATOR

**Takayoshi Masutani, Aichi, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan**

**Continuation-in-part of Ser. No. 974,437, Dec. 29, 1978. This application Jun. 20, 1980, Ser. No. 161,511**

**Int. Cl.³ H02J** *7/14*

**U.S. Cl. 322—99** **5 Claims**




1. A device for indicating the rate of charge in an AC generator for a vehicle comprising an exciting diode for feeding electric current to a field coil and a contactless regulator, and whose output end is connected to a battery mounted on the vehicle for charging, characterized in that:

a relay coil is coupled to a junction of the exciting diode, a field coil and one end of an electric power switch, the other end of which is connected to said battery;

an anode end of at least one Zener diode is connected to the other end of said relay coil in series;

a normally open contact closing through the excitation of said relay coil is provided; and

the device for indicating the rate of charge is connected to said battery through said normally open contact.

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**4,303,879**

## METAL DETECTOR CIRCUIT WITH MODE SELECTION AND AUTOMATIC TUNING

**Robert J. Podhrasky, Dallas, Tex., assignor to Garrett Electronics, Garland, Tex.**

**Filed Jan. 29, 1979, Ser. No. 7,311**

**Int. Cl.³ G01V** *3/11, 3/165*

**U.S. Cl. 324—329** **11 Claims**

1. A metal detector circuit, comprising:

an oscillator for producing a transmit signal;

a transmit coil connected to receive said transmit signal and produce an electromagnetic field;

a receive coil located in the region of said electromagnetic field for producing a receive signal;

means for storing a first parameter for a first mode of operation for said metal detector circuit;

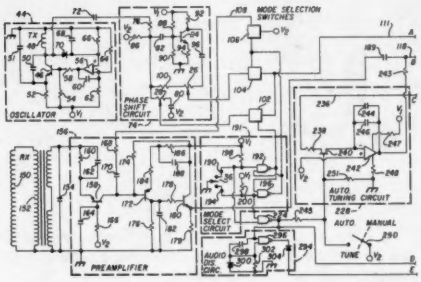
means for storing a second parameter for a second mode of operation for said metal detector circuit;

means for receiving said transmit signal or said receive signal and operating in conjunction with said means for storing a first parameter and said means for storing a second parameter to provide a first relative phase shift between said transmit signal and said receive signal for operation of said metal detector circuit in said first mode and a second relative phase shift between said transmit signal and said receive signal for operation of said metal detector circuit in said second mode;

a synchronous demodulator connected to receive said transmit signal and said receive signal, after provision of said first or said second relative phase shifts, for demodulating said receive signal to produce an output signal, said output signal for indicating detection of an object by said metal detector circuit;

a mode selection circuit having first and second states for respectively selecting said first mode or said second mode of operation for said metal detector circuit;

means connected to said mode selection circuit for providing said transmit signal or said receive signal to said synchronous demodulator wherein said transmit signal and said receive signal are provided to said synchronous demodulator and have either said first relative phase shift or said second relative phase shift provided therebetween, the selection of said first or said second relative phase shift determined by the state of said mode selection circuit;




means for generating a tuning signal which corresponds to a selected state of said output signal;

means for combining said output signal with said tuning signal to produce a control signal; and

means responsive to said control signal for automatically driving said output signal to said selected state in response to activation of said mode selection circuit when said mode selection circuit is activated to select either said first or said second mode of operation for said metal detector circuit.

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**4,303,880**

## GATED PRECISION OFFSET CIRCUIT FOR A DIGITAL METER HAVING A DUAL SLOPE ANALOG-TO-DIGITAL CONVERTER

**Irwin Munt, Springfield; Philip Emile, Jr., Roseland, and John G. Walden, Houston, all of Tex., assignors to Sangamo Weston, Inc., Norcross, Ga.**

**Filed Sep. 26, 1979, Ser. No. 79,310**

**Int. Cl.³ G01R** *17/06;* **H03K** *1/02, 13/02*

**U.S. Cl. 324—99 D** **7 Claims**

1. In a dual slope analog-to-digital converter, said converter having an integrator and including means for generating a control signal responsive to an integrate operation, the improvement comprising:

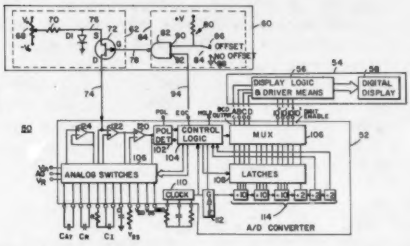
means for generating a user selectable offset signal for application to said integrator including:

an offset signal source, said offset signal having a magnitude which is continuously variable by a user;

means, selectable by a user, for selecting or disabling said offset signal;

logic means, responsive to said integrate control signal and

to said offset selecting means for generating a gating signal; and




switch means, responsive to said gating signal, for applying said offset signal to an input of said integrator only during said integrate operation.

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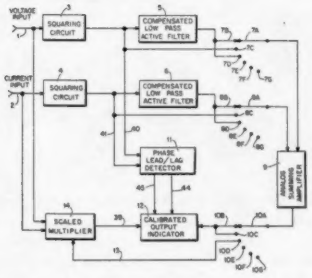
**4,303,881**

## MULTI-FUNCTION A.C. POWER METER

**Arthur S. A. Czerwien, and Heinz E. Feyer, both of 3367 Freidinger Dr., Pensacola, Fla. 32506**

**Filed Mar. 12, 1979, Ser. No. 19,729**
**Int. Cl.³ G01R *21/06, 25/00***
**U.S. Cl. 324—142** **8 Claims**




1. An electrical meter for measuring various parameters of an alternating current line, comprising:

(a) a first input terminal;

(b) a voltage probe for sampling a first voltage of an alternating current line and for applying said first voltage to said first input terminal;

(c) a second input terminal;

(d) a current probe for sampling a current of an alternating current line, for converting said current into a second voltage, and for applying said second voltage to said second input terminal;

(e) a first means connected to said first input terminal for converting said first voltage into a first square wave;

(f) a second means connected to said second input terminal for converting said second voltage into a second square wave;

(g) a first compensated low pass active filter connected to said first voltage converting means for producing a first filtered square wave;

(h) a second compensated low pass active filter connected to said second voltage converting means for producing a second filtered square wave;

(i) an analog summing amplifier connected to receive said first and second filtered square waves and produce an output signal therefrom; and

(j) a calibrated output indicator connected to receive said output signal;

wherein said calibrated output indicator indicates power factor.

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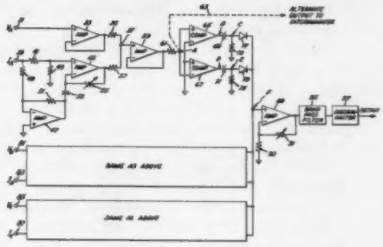
**4,303,882**

## METHOD AND APPARATUS FOR MONITORING TORSIONAL VIBRATION IN THE ROTOR OF A DYNAMOELECTRIC MACHINE

**John F. Wolfinger, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Oct. 19, 1979, Ser. No. 86,405**
**Int. Cl.³ G01R *31/00*; G08B *21/00*; H02H *7/06***
**U.S. Cl. 324—158 MG** **13 Claims**



8. Apparatus for monitoring small variations in the rotational speed of the rotor of a dynamoelectric machine of at least single phase and producing voltage and current for transfer to a load through output terminals, said apparatus comprising for at least one phase of said dynamoelectric machine;

means for producing a signal representative of the output terminal voltage;

means for producing a signal representative of voltage drop internal to said dynamoelectric machine;

means for summing said terminal voltage signal and said internal voltage drop signal to produce a signal representative of instantaneous mechanical angle of said rotor.

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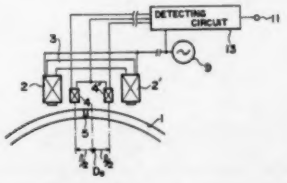
**4,303,883**

## APPARATUS FOR DETECTING THE CENTER OF A WELDED SEAM IN ACCORDANCE WITH FUNDAMENTAL HARMONIC COMPONENT SUPPRESSION

**Toshihiro Mori; Seigo Ando, and Hironobu Akuzawa, all of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 12, 1979, Ser. No. 57,029**
**Claims priority, application Japan, Jul. 17, 1978, 53-86123**
**Int. Cl.³ G01B *7/14*; G01R *33/12*; G01N *27/72***
**U.S. Cl. 324—208** **6 Claims**




1. An apparatus for detecting the center of a welded seam of an AC magnetized welded steel material by detecting leakage flux from said welded seam comprising:

an AC power source having an output,

magnetizing means connected to said AC power source for AC magnetizing said steel material by magnetic flux crossing said welded seam,

leakage flux search means fixedly mounted integral with said magnetizing means for detecting leakage flux from said welded seam so as to provide an induced voltage corresponding to a change in said leakage flux, said induced voltage comprising a fundamental harmonic corresponding to an excitation voltage waveform used for said AC magnetization and a pulse like component corresponding to said welded seam, and

detecting means responsive to said induced voltage from said leakage flux search means for detecting a center position of said welded seam in terms of a relative positional relation between said center position and said leakage flux search means;

wherein said detecting means comprises first means for eliminating from said induced voltage the fundamental harmonic component corresponding to the excitation voltage waveform used for said AC magnetization while leaving at least the pulse-like component, second means for producing from said output of said AC power source a gate pulse signal having a predetermined period for sampling, and third means responsive to said gate signal for sampling at said predetermined period, said induced voltage having said fundamental harmonic component eliminated therefrom and having at least said pulse-like component, whereby in accordance with the polarity and voltage value of a sampled output from said third means the center position of said welded seam is detected in terms of a relative positional relation between said center position and said search means.

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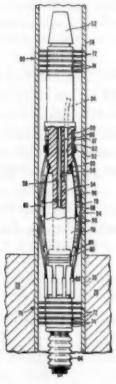
**4,303,884**

## INFLATABLE EDDY CURRENT INSPECTION PROBE FOR INSPECTION OF TUBULAR MEANS

**Franklin S. Malick, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Oct. 19, 1978, Ser. No. 952,889**
**Int. Cl.³ G01N *27/72, 27/82;* G01R *33/12***
**U.S. Cl. 324—220** **6 Claims**



1. An inspection probe for internally inspecting tubes comprising:

a central body capable of being disposed in said tube;

a plurality of flexible strips having one end firmly attached to said central body and having the other end slidably attached to said central body;

an eddy current coil attached to each of said strips;

inflatable means disposed on said central body and between said central body and said strips for expanding said strips into contact with said tube, thereby placing said eddy current coil in close proximity to said tube for detecting defects in said tube;

pads mounted on the inner side of said strips for preventing said inflation means from being damaged by said tube;

a nose attached to said central body and having at least two elastomeric members disposed therearound with a brush disposed therebetween and with said brush being capable of extending into contact with said tube for positioning said probe within said tube; and

a tail attached to said central body and having at least two elastomeric members disposed therearound with a brush disposed therebetween and with said brush being capable of extending into contact with said tube for positioning said probe within said tube.

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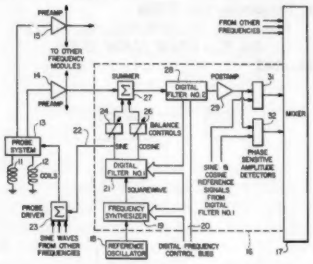
**4,303,885**

## DIGITALLY CONTROLLED MULTIFREQUENCY EDDY CURRENT TEST APPARATUS AND METHOD

**Thomas J. Davis, and Charles B. Perry, both of Richland, Wash., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.**

**Filed Jun. 18, 1979, Ser. No. 49,192**
**Int. Cl.³ G01R *33/12;* G01N *27/82***
**U.S. Cl. 324—237** **26 Claims**




1. A digitally controlled eddy current test apparatus including at least one coil adapted to be coupled to an object to be tested to induce eddy currents in said object which in turn induce voltages in said coil or in a sensing coil comprising

means for receiving and providing a digital frequency control signal,

a frequency synthesizer connected to receive said digital frequency control signal and provide an output signal at frequency $f_1$ determined by said digital frequency control signal,

a first digital filter connected to receive said digital frequency control signal and said output signal and having its center frequency controlled by said digital control signal whereby to be tuned to the frequency of said output signal and provide sine and cosine output signals,

means for receiving one of said sine of cosine outputs and applying the same to said coil to induce eddy currents in said object,

means for receiving the voltage induced by the eddy currents in said object in said coil or sensing coil to null out in-phase and quadrature quiescent components from said induced voltage to produce a nulled output signal $E_1$ sine $(\omega t+\theta)$

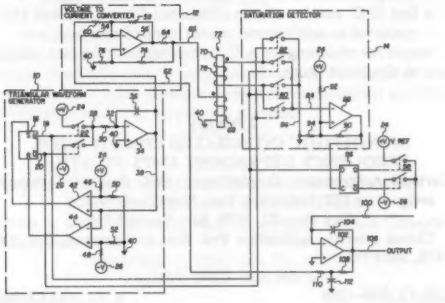
a second digital filter having its frequency controlled by said digital frequency control signal serving to filter said nulled input signal and pass only signals of said frequency $f_1$, and

phase sensitive detectors connected to receive said filtered nulled signal and sine and cosine signals from said first digital filter and provide Fourier amplitude coefficients $A_1$ and $B_1$ of the coil voltage at the frequency $f_1$ where $A_1=E_1$ cosine $\theta$ and $B_1=E_1$ sine $\theta$.

## 4,303,886
## MAGNETIC FIELD STRENGTH MEASURING APPARATUS

**Melvin H. Rhodes, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Aug. 22, 1979, Ser. No. 68,838**
**Int. Cl.³ G01R *33/04***
**U.S. Cl. 324—255** **3 Claims**



**1**. Apparatus of the class described comprising, in combination:

magnetic sensor means including first and second windings;

drive means, connected to said first winding, for cyclically increasing the magnetic field in said sensor means to a value greater than that value which causes saturation in said sensor means;

detection means, connected to said second winding, for providing an output signal whenever the absolute magnitude of signals received from said second winding is greater than a predetermined value;

conversion means, connected to said detection means, for providing a bilevel output signal which changes once for each occurrence of an output signal from said detection means;

integration means, connected to said conversion means, for providing an apparatus output signal indicative of the non-symmetry history of bilevel output signals received from said conversion means; and

feedback means, connected between said integration means and said drive means, for returning a feedback signal which substantially cancels the effect of an external field being measured.

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## 4,303,887
## ELECTRICAL LIQUID CONDUCTIVITY MEASURING SYSTEM

**Jeremy R. Hill, Weston, and Allen E. Meyer, Greenwich, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.**

**Filed Oct. 29, 1979, Ser. No. 89,087**
**Int. Cl.³ G01R *27/22***
**U.S. Cl. 324—441** **20 Claims**

**1**. An electronic device for measuring conductivity of a blood sample of predetermined volume, said device comprising:

generating means for generating a signal of predetermined frequency;

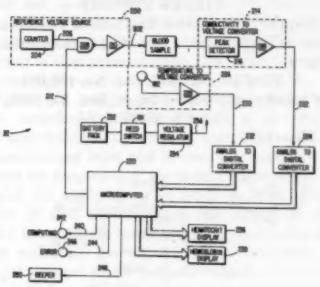
electrode means for passing said signal through said blood sample;

control means for activating and deactivating said generating means at regular predetermined time intervals chosen to prevent polarization of said blood sample about said electrode means;

first monitoring means connected to said electrode means for monitoring the conductivity of said blood sample;

second monitoring means for monitoring the temperature of said blood sample; and

temperature-compensating means responsive to said monitored conductivity and said monitored temperature for producing a conductivity signal indicative of the temperature-compensated conductivity of said blood sample, said temperature-compensating means including computer means having a memory, said memory storing information relating to a predetermined range of temperature-compensated conductivity.



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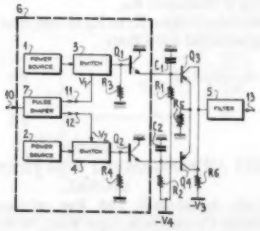
## 4,303,888
## DEMODULATION DEVICE FOR FREQUENCY MODULATED ELECTRICAL SIGNALS

**Claude Claverie, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Sep. 25, 1979, Ser. No. 78,803**
**Claims priority, application France, Sep. 29, 1978, 78 27917**
**Int. Cl.³ H03D *3/00***
**U.S. Cl. 329—103** **2 Claims**



**1**. A demodulation device for demodulation of frequency modulated signals comprising; amplitude limiting means having an input for receiving the signal to be demodulated, and a first path for limiting the amplitude of positive alternations of said frequency modulated signals and providing a first output, and a second path for limiting the amplitude of negative alternations of the frequency modulated signal and providing a second output; integration means connected to receive the first and second outputs of said amplitude limiting means for integrating the signals therefrom and for integrating said signals with a first and a second time constant; said integration means further comprises first and second identical circuits coupled respectively to the first and second outputs of the amplitude limiting means, each circuit comprises a transistor having a base coupled to the corresponding output of the amplitude limiting means, and a capacitor and a charging resistor coupling the base of the transistor to ground and a reference voltage source in such a way that each capacitor is charged by the reference voltage through the charging resistor toward a voltage of predetermined value in accordance with the first time constant, and then discharged across the amplitude limiting

means in accordance with a second time constant; and a low-pass filter having an input coupled to receive signals from the outputs of the transistors.

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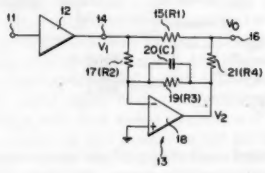
**4,303,889**

## FILTER CIRCUIT

**Kenji Yokoyama, and Masaru Ida, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Dec. 4, 1979, Ser. No. 100,051**
**Claims priority, application Japan, Dec. 29, 1978, 53-179409**
**Int. Cl.³ H03F *1/34***
**U.S. Cl. 330—107** **4 Claims**




1. A filter circuit having an input and an output, comprising:
an inverting amplifier having an input and an output;
a first resistor connected between an input and an output of said filter circuit and having a resistance $R_1$;
a second resistor connected between said input of said filter circuit and said input of said inverting amplifier and having a resistance $R_2$;
a third circuit connected between said input and output of said inverting amplifier, said third circuit comprising a parallel combination of a third resistor having a resistor value $R_3$ and a capacitor; and
a fourth resistor connected between said output of said inverting amplifier and said output of said filter circuit and having a resistance $R_4$;
said resistance values $R_1$ to $R_4$ of said first to fourth resistors being selected such that

$$R_1 \cdot R_3 = R_2 \cdot R_4.$$

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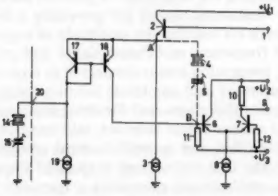
**4,303,890**

## CIRCUIT ARRANGEMENT FOR TRANSFERRING A SIGNAL

**Eckart Pech, Ammersbek, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 5, 1979, Ser. No. 91,297**
**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1978, 2855930**
**Int. Cl.³ H03F *3/04***
**U.S. Cl. 330—257** **4 Claims**




1. A circuit arrangement for transferring a signal from a first A.C. circuit point to a second A.C. circuit point, which comprises:
means for providing an A.C. input signal to said first A.C. circuit point;
a resonant impedance circuit having first and second terminals, said first terminal being connected to an A.C. circuit ground point;
a current mirror circuit having a common terminal, a control terminal and a controlled terminal, said control terminal being connected to said second terminal of the resonant impedance circuit, said common terminal being connected to the first A.C. circuit point, and said controlled terminal being connected to said second A.C. circuit point;
a first D.C. current source connected from a selected D.C. potential to said current mirror control terminal; and
means for obtaining an A.C. output signal from said second A.C. circuit point.

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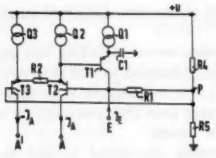
**4,303,891**

## MONOLITHIC INTEGRATED CIRCUIT WITH FREQUENCY DEPENDENT AMPLIFICATION

**Gerhard Achtstaetter, Gundelfingen, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.**

**Filed Dec. 10, 1979, Ser. No. 102,216**
**Claims priority, application Fed. Rep. of Germany, Dec. 18, 1978, 2854704**
**Int. Cl.³ H03F *3/45***
**U.S. Cl. 330—260** **2 Claims**




1. A monolithic integrated circuit with frequency dependent amplification, employing a first transistor operated as an emitter follower, and a capacitor applied with one side to the zero point of the circuit, wherein the improvement comprises:
the capacitor being connected between the emitter of the first transistor which is operated as an emitter follower and the zero point of the circuit;
a first resistor connecting the collector of the first transistor to a point of constant potential;
the collector of the first transistor being applied to the base of a second transistor operated as an emitter follower, with the emitter thereof being connected to the base of the first transistor;
the emitter of a third transistor operated as an emitter follower, being connected across a second resistor to the emitter of said second transistor;
the base of said third transistor being applied to the point of constant potential; and
a signal input at the base of the second transistor, and a signal output being the collector of one of said second and third transistors, whereby amplification of bass frequencies is increased.

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**4,303,892**

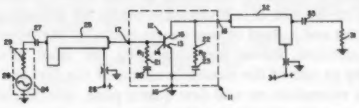
## UNCONDITIONALLY STABILIZED MICROWAVE TRANSISTOR AMPLIFIER

**Carroll E. Weller, Cincinnati, Ohio, and Thomas J. Woodruff, Fort Thomas, Ky., assignors to Cincinnati Electronics Corporation, Cincinnati, Ohio**

**Filed Oct. 2, 1979, Ser. No. 81,143**
**Int. Cl.³ H03F *3/60***
**U.S. Cl. 330—286** **21 Claims**

1. An amplifier for feeding a microwave signal source to a load matched to the source comprising a microwave semiconductor amplifying element having input, output and common electrodes, a first tuned matching network connected between the source and input electrode, a second tuned matching net-

work connected between the load and output electrode, means for supplying bias voltage to the amplifying element, resistor means connected in shunt with at least one of the input and



output electrodes and the common electrode, the value of the resistor means being selected to assure unconditional stability of the semiconductor amplifying element.

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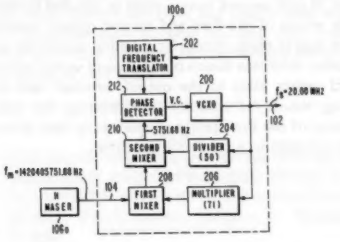
**4,303,893**

## FREQUENCY SYNTHESIZER INCORPORATING DIGITAL FREQUENCY TRANSLATOR

**Edwin A. Goldberg, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Mar. 5, 1979, Ser. No. 17,101**
**Int. Cl.³ H03L** *7/18, 7/26*
**U.S. Cl. 331—1 A** **8 Claims**




**1**. In a frequency synthesizer for generating an output signal at a first specified frequency with a precision determined by that of an accurate and precise applied clock signal having a second specified frequency higher than said first specified frequency, said first and second specified frequencies bearing no harmonic relationship therebetween; said synthesizer comprising:

first means including a voltage-controlled crystal oscillator, a phase detector coupled to said oscillator for generating a control voltage applied to said oscillator having a value determined by the phase difference between first and second control signals applied as respective inputs to said phase detector, said control voltage applied to said oscillator effecting a reduction in any error between the actual then-existing frequency of said output signal and said first specified frequency;

second means for producing said first control signal, said second means including a frequency down-converter responsive to the frequency difference between said second specified frequency and the sum of a certain number of derived frequencies harmonically related to the then-existing frequency of said output signal for producing said first control signal, said first control signal having a third specified frequency only when the then-existing frequency of said output signal has exactly said first specified frequency, said third specified frequency being lower than said second specified frequency; and

third means for producing said second control signal, said third means including a digital frequency translator for multiplying the then-existing frequency of said output signal by that preselected certain numerical proper fraction which produces a product frequeny for said second control signal having a value equal to said third specified frequency only when the then-existing frequency of said output signal has exactly said first specified frequency;

wherein said digital frequency translator includes an ordinal series of a predetermined number of pulse snatchers each having its own associated preselected-integer frequency divider individually interconnected thereto, each pulse snatcher and its frequency divider being responsive to a serial stream of successive pulses applied as an input thereto for removing from said serial stream forwarded to the output of that pulse snatcher one pulse for each count of successive input pulses equal in number to the value of the preselected integer associated with that frequency divider, coupling means for applying as an input to the first of said ordinal series of pulse snatchers a serial stream of pulses derived from and in time synchronous relationship with the frequency of the output signal of said synthesizer and for applying as an input to each other pulse snatcher of said ordinal series the output of the pulse snatcher immediately preceding that other pulse snatcher, and an additional preselected-integer frequency divider having the output of the last pulse snatcher in said ordinal series applied as an input thereto, said respective values of said preselected integers of said frequency dividers being chosen to produce said product frequency for said second control signal at the output of said additional frequency divider.

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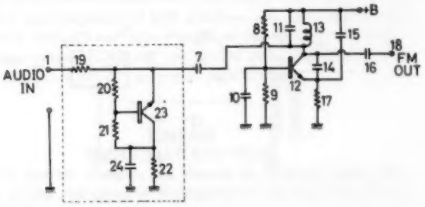
**4,303,894**

## FM MODULATOR USING VARIABLE TRANSISTOR CAPACITANCE

**Itsuo Akazawa, Soma, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Feb. 4, 1980, Ser. No. 118,518**
**Claims priority, application Japan, Feb. 8, 1979, 54-15220[U]**
**Int. Cl.³ H03C** *3/14*
**U.S. Cl. 332—16 T** **2 Claims**

Fig. 2




**1**. An FM modulation circuit comprising a variable capacitance circuit including a first transistor having respective resistors connected between the emitter and base thereof and between the collector and base thereof; and an oscillation circuit including a second transistor coupled to said first transistor, said first transistor being connected in an unbiased state whereby an input signal applied across the emitter and collector of said first transistor will vary the capacitance thereof.

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**4,303,895**

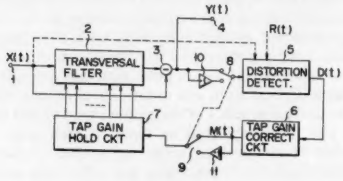
## AUTOMATIC EQUALIZER

**Shunichi Ohnishi, Yokohama; Masaharu Obara, Tokyo; Masaru Sakurai, Kawasaki, and Hisashi Yamada, Yokohama, all of Japan, assignors to Nippon Hoso Kyokai, Tokyo and Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, both of, Japan**

**Filed Jun. 10, 1980, Ser. No. 158,311**
**Claims priority, application Japan, Feb. 14, 1979, 54-15646**
**Int. Cl.³ H04B** *3/04*
**U.S. Cl. 333—18** **6 Claims**

**1**. An automatic equalizer comprising a transversal filter connected to receive an input signal to be equalized and having tap gains adjustable by control voltages supplied from outside; a circuit connected to receive an output signal from the trans-

versal filter and the input signal to be equalized to produce an equalized output signal; a distortion detect circuit connected to receive the equalized output signal to detect a distortion component contained in the output signal and to produce a distortion detect signal in correspondence with the distortion component: a tap gain correct circuit responsive to the distortion detect circuit to produce tap gain correct signals; and a tap gain hold circuit responsive to the tap gain correct circuit to




correct the control voltages supplied to the transversal filter based on the tap gain correct signals and hold the corrected control voltages;

characterized by further comprising polarity inverting means for synchronously and periodically inverting the polarity of a signal component included in the distortion detect signal produced at the output of the distortion detect circuit and the polarity of the correct signals.

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**4,303,896**

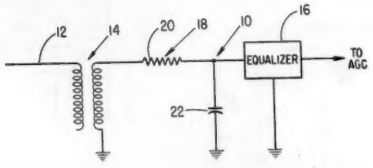
**WIDE RANGE DATA CABLE EQUALIZER**

**Chet J. Slabinski, Chagrin Falls, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.**

**Filed May 21, 1980, Ser. No. 151,858**

**Int. Cl.³ H03H** *7/03, 7/32*

**U.S. Cl. 333—28 R** **2 Claims**




1. A preset equalizing circuit for data bit transmission lines having a wide range of response times substantially between a subnanosecond and 1.5 microseconds comprising:

a fixed delay device series-connected to the data bit transmission lines to provide a delay close to the high end of the range of response of said transmission lines to convert the range of transmission line response to the range substantially between 1 and 3 microseconds; and

a fixed equalizer for restoring the signal transmitted by the data bit transmission lines connected to said fixed delay device having a response time substantially in the range of 1 to 3 microseconds.

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**4,303,897**

**CRYSTAL FILTER STRUCTURE FOR REALIZING A LADDER FILTER**

**Horst G. Augst, Skärholmen, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden**

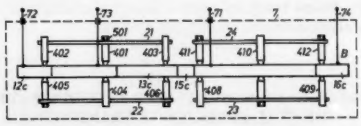
**Filed Dec. 11, 1979, Ser. No. 102,424**

**Claims priority, application Sweden, Dec. 20, 1978, 7813108**

**Int. Cl.³ H03H** *9/54, 9/56*

**U.S. Cl. 333—189** **5 Claims**

1. A crystal filter structure for realizing a ladder filter having at least three L-links connected in cascade between an input terminal and an output terminal comprising a plate-like substrate, a quartz plate for each L-link, each quartz plate including two electrode means for defining first and second quartz resonators, means for mounting at least a first of said quartz plates on one side of said substrate, means for mounting at least a second and a third of said quartz plates on the other side of said substrate, means for connecting the input terminal in parallel to one of the electrode means of the first and second quartz resonators on said first quartz plate, interside connecting means for connecting the other electrode means of the second quartz resonator of said first quartz plate in parallel to




one of the electrode means of the first and second quartz resonators of said second quartz plate, intraside connecting means for connecting the other electrode means of the second quartz resonator of said second quartz plate in parallel to one of the electrode means of the first and second quartz resonators of said third quartz plate, output connecting means for connecting the other electrode means of the second quartz resonator of said third quartz plate to the output terminal, and common connecting means for commonly connecting the other electrode means of the first quartz resonators of said three quartz plates in common to a reference potential.

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**4,303,898**

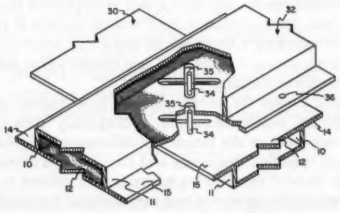
**LONGITUDINALLY FLANGED WAVEGUIDE**

**Richard R. Kinsey, Dewitt; George W. Halbritter, North Syracuse; David L. Binsley, Liverpool; Allan E. Rasmussen, and Howard Q. Totten, both of Fayetteville, all of N.Y., assignors to General Electric Company, Syracuse, N.Y.**

**Filed Aug. 15, 1980, Ser. No. 178,441**

**Int. Cl.³ H01P** *5/18*

**U.S. Cl. 333—114** **6 Claims**



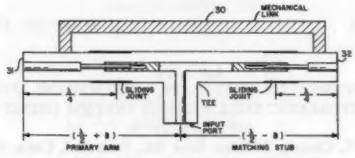

1. A rectangular waveguide including opposing sidewalls and a coupling wall, said waveguide further including a flange extending from each sidewall and having a contact surface in parallel with the coupling wall, and flanges being positioned relative to the coupling wall so as to adapt the waveguide for crossguide coupling with another rectangular waveguide having a similar flange configuration, whereby the contact surface of each flange contacts the coupling wall of the other waveguide.

4,303,899

## MATCHED HIGH Q, HIGH FREQUENCY RESONATORS

Thomas A. Barley; Gustaf J. Rast, Jr., both of Huntsville, Ala., and James R. Ashley, Boulder, Colo., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 5, 1980, Ser. No. 146,804
Int. Cl.³ H01P 7/04
U.S. Cl. 333—225 4 Claims




1. A high-frequency resonator comprising a tee connection having first and second arms extended from an in/out port; first and second sliding joints on the ends of said first and second arms respectively; third and fourth arms having one end connected to said first and second sliding joints respectively; the other ends of said third and fourth arms being connected to electrical short circuits; and said third and fourth arms being moveably mounted on said sliding joints so as to vary the length of said arms.

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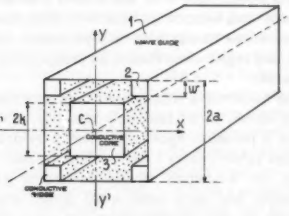
4,303,900

## WIDE BAND WAVEGUIDE WITH DOUBLE POLARIZATION AND ULTRA-HIGH FREQUENCY CIRCUIT INCORPORATING SUCH A WAVEGUIDE

Jacky Tourneur, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Apr. 10, 1980, Ser. No. 139,123
Claims priority, application France, Apr. 13, 1979, 79 09493
Int. Cl.³ H01P 3/123, 1/161
U.S. Cl. 333—239 6 Claims



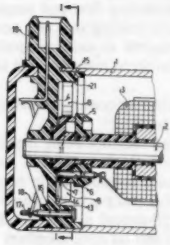

1. A wide band waveguide with double polarization comprising a polygonal waveguide having, with respect to a center of symmetry C, a symmetry of the order 4n in which n is a random integer, and which is such that a rotation of the cross-section about said center of symmetry by an angle of $2\pi/4n$ does not change properties of the waveguide, wherein on the one hand a polarity of conductive ridges, whose cross-section determines with the polygonal section a transmission section of the waveguide, is provided on the inner face of the sides of the waveguide in accordance with a symmetry of the order 4 with respect to said center of symmetry, the longitudinal plane of symmetry of each ridge being oriented, in the waveguide transmission section, in the direction of the bisectors of the principal axis of the waveguide, and on the other hand within the waveguide a central conductive core is provided, whose section has a same symmetry of the order 4n with respect to said center of symmetry.

4,303,901

## ELECTROMAGNETIC FUEL CONTROL ELEMENT

Gerold Grimm, Leonberg, and Ulrich Kemmner, Sachsenheim, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Nov. 26, 1979, Ser. No. 97,258
Claims priority, application Fed. Rep. of Germany, Feb. 21, 1979, 2906566
Int. Cl.³ H01F 7/08
U.S. Cl. 335—272 5 Claims



1. An electromagnetic fuel control element comprising, in combination, a housing, an outer roller path body mounted on said housing, an inner roller path body disposed within said housing, an electromagnetically actuatable armature rotatably supported within said housing for a repeatable rotary movement with said inner roller path body throughout a limited rotary angle, a plurality of elastically deformable electrical current conductors each connected at one end to one of a plurality of contact pins supported by said outer roller path body, the other end of each of said conductors secured to one of another plurality of contact pins supported by said inner roller path body, said conductors being arranged in a loop-like configuration between said inner and outer roller path bodies whereby upon rotation of said armature and said inner roller path body through said rotary angle with respect to said housing, said conductors roll off one of said roller path bodies and roll up on the other of said roller path bodies.

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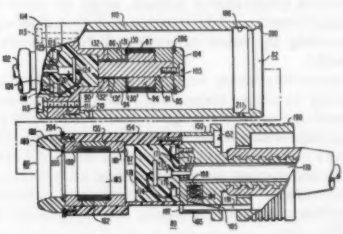
4,303,902

## INDUCTIVE COUPLER

Laban E. Lesster, Crofton, and Everett W. Opdahl, Lutherville, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 31, 1979, Ser. No. 71,633
Int. Cl.³ H01F 15/02, 23/00
U.S. Cl. 336—83 10 Claims



1. Inductive coupler apparatus comprising:

(A) a first support assembly including an elongated rod portion having a free end;

(B) a first magnetic flux supporting elongated core member extending around and carried by said rod portion, and

including first and second end portions and a central portion joining said end portions;

(C) retaining means coupled to said free end of said rod portion to maintain said first core member in position;

(D) a first winding positioned around said central portion;

(E) a second and generally hollow cylindrical support assembly;

(F) a second magnetic flux supporting core member positioned around the inner surface of said second support assembly, and being of a generally hollow cylindrical shape and including first and second end portions and a central portion joining said end portions;

(G) means coupled to said generally hollow cylindrical support assembly to maintain said second core member in position;

(H) a second winding positioned around the inner surface of said central portion;

(I) said first core member being matable within said second core member such that said first and second end portions of said first core member are in magnetic flux registration with respective end portions of said second core member;

(J) an outer cylindrical protective shell surrounding both said first and second core members when in a mated condition; and

(K) said protective shell being carried by said first support assembly and being of a length to extend past said free end of said rod portion.

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**4,303,903**

## PRESSURE SENSITIVE APPARATUS

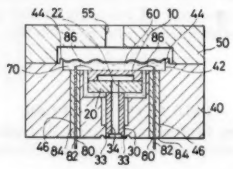
**Yoshitaka Matsuoka; Michitaka Shimazoe; Yoshimi Yamamoto; Mitsuo Ai; Keiji Miyauchi; Hideyuki Nemoto; Masatoshi Tsuchiya, and Masanori Tanabe, all of Ibaraki, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Sep. 21, 1979, Ser. No. 77,838**

**Claims priority, application Japan, Sep. 22, 1978, 53-115918**

**Int. Cl.³ H01L** *10/10*

**U.S. Cl. 338—4** **8 Claims**




1. A pressure sensitive apparatus for providing an output in response to a pressure, comprising:

a semiconductor diaphragm assembly on which a pressure sensitive diaphragm is formed, strain sensitive elements being formed on said pressure sensitive diaphragm and providing an output depending on the pressure applied thereto;

first supporting means being made of borosilicate glass and having an upper surface on which said semiconductor diaphragm assembly is rigidly and hermetically bonded;

second supporting means being made of an iron-nickel alloy with a nickel content lying within a range of from 35% to 43% and having an upper surface on which said first supporting means integrated with said semiconductor diaphragm assembly is rigidly and hermetically bonded; and

housing means, within which said integrated semiconductor diaphragm assembly, said first supporting means and said second supporting means are positioned, and said second supporting means being rigidly fixed to a base of said housing means at the lower end portion thereof, said semiconductor diaphragm assembly being directly bonded to the borosilicate glass of said first supporting means and the iron-nickel alloy of said second supporting means being directly bonded to the borosilicate glass of said first supporting means by anodic bonding.

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**4,303,904**

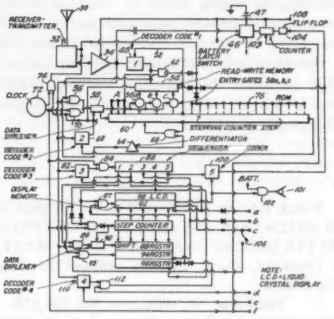
## UNIVERSALLY APPLICABLE, IN-MOTION AND AUTOMATIC TOLL PAYING SYSTEM USING MICROWAVES

**Norman E. Chasek, 24 Briar Brae Rd., Stamford, Conn. 06903**

**Filed Oct. 12, 1979, Ser. No. 84,370**

**Int. Cl.³ G08G** *1/12;* **H04B** *1/00*

**U.S. Cl. 340—23** **10 Claims**




1. A universally applicable, automatic, vehicular toll paying system comprised of,

a pre-paid cash balance registration means that electronically extracts stored data from and inserts a newly computed pre-paid cash balance into the memories associated with a vehicle borne transponder-data-processor, and then transfers all said registration data to an independent bookkeeping system,

a vehicle borne microwave transponder-data processor that permanently stores, in its read-only-memory, a vehicle-owner code, a payment agent code and a vehicle class code; receives vehicle entry location data, by microwave transmission, for temporary storage in one of its read-write memories, and upon subsequent coded interrogation, transmits all said identification and entry location data, receiving back a toll amount from a pre-paid balance that is stored in a second read-write memory, said balance being visually displayed; and upon completion of the subtraction, transmitting a code that indicates if the balance is negative or not,

a toll booth transponder-computer which periodically transmits, by microwave, an interrogation code and receives back from a passing vehicle transponder, following the interrogation, stored data from which said transponder-computer calculates a toll and transmits said toll amount back to said vehicle transponder, receiving back either a pass or reject code, or no response, said response activating appropriate vehicle pass or reject apparatus and the results of said transaction are transferred to an independent bookkeeping system, and

a toll system entry location microwave transmitter, that periodically transmits a fixed code followed by that entry location's identification code.

4,303,905

## METHOD AND APPARATUS FOR CALCULATING THE GREEN LIGHT TIME IN TRAFFIC-DEPENDENTLY CONTROLLABLE STREET TRAFFIC SIGNAL SYSTEMS

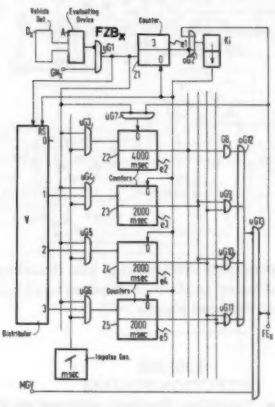
Peter Drebinger, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Aug. 31, 1978, Ser. No. 938,410

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1977, 2739863

Int. Cl.³ G08G 1/08

U.S. Cl. 340—41 R 8 Claims



1. An apparatus for determining and prematurely terminating the green light duration in a programmed traffic-dependently controllable street traffic system utilizing measured time intervals, between successive vehicles comprising means, including a vehicle detector, for deriving signals representing actual time values of intervals between successive vehicles of a traffic flow during the duration of a green light signal, first comparing means to which said actual time values are supplied for comparing said actual time values with a first theoretical time limit value, a first OR gate having a first input to which said first comparing means is connected whereby, upon an actual time value reaching said first theoretical value, a disconnect order for termination of the green light duration appears at the output of said first OR gate, second comparing means to which successive actual time values are supplied for comparing the actual time values of a predetermined number of successive intervals with a second theoretical time value, said second comparing means having a plurality of outputs equal to said predetermined number at which a signal appears when a respective one of said intervals exceeds said second theoretical time value, and an AND gate means connecting said outputs of second comparing means to said first OR gate, whereby upon any two actual time values each exceeding said second theoretical time value said AND gate means is enabled and a disconnect order for the termination of the green light duration likewise appears at the output of said first OR gate.

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4,303,906

## VEHICLE ACCELERATION MONITORING DEVICE

Burton Weakley, Sandton, South Africa, assignor to Plustronix (Proprietary) Limited, Wynberg, South Africa

Filed Oct. 23, 1979, Ser. No. 87,538

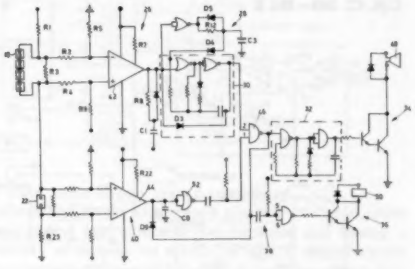
Claims priority, application South Africa, Nov. 6, 1978, 78/6232

Int. Cl.³ B60Q 9/00

U.S. Cl. 340—52 R 4 Claims

1. Apparatus for monitoring the manner in which a vehicle is driven which comprises switch means which are actuated when subjected to predetermined accelerative forces and means to monitor the operation of said switches;

wherein said switch means include at least five series connected switches, each switch comprising a container, a pair of contacts at the lower end of the container and conductive material located in the container which normally bridges the contacts, four of said switches being arranged at angular intervals of 90° from one another with each capsule being inclined to the horizontal so that the



conductive material travels upwardly and moves away from the contacts open-circuiting them when subjected to a predetermined accelerative force, and a fifth switch disposed with its container substantially vertically aligned;

said monitor means including first and second detectors, said first detector detecting the open-circuiting of any of said four switches to generate a first signal, said second detector detecting the open-circuiting of said fifth switch to generate a second signal.

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4,303,907

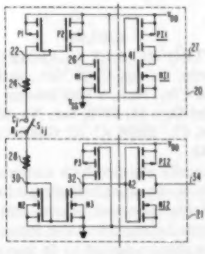
## LOW POWER SWITCH CLOSURE SENSING CIRCUIT

Robert E. Wilson, Whitehouse Station, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 17, 1979, Ser. No. 103,924

Int. Cl.³ G06F 3/02

U.S. Cl. 340—365 S 5 Claims



1. The combination comprising:

first and second conductors, electrically isolated from each other;

a first normally non-conducting current sourcing circuit connected at one point to said first conductor;

a second normally non-conducting current sinking circuit connected at one point to said second conductor;

a normally open switch connected between said first and second conductors; and

said switch, when closed, providing a conduction path for passing current between said current sourcing and said current sinking circuits rendering both conductive in response to the switch closure and immediately causing

said first and second circuits to produce output signals indicative of the switch closure.

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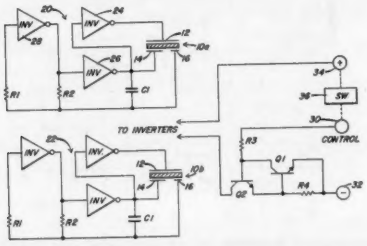
## 4,303,908
## ELECTRONIC SOUNDER

**Robert B. Enemark, Duxbury; Aaron A. Galvin, Lexington, and Stephen Marchetti, Norwell, all of Mass., assignors to American District Telegraph Company, New York, N.Y.**

**Filed Jun. 3, 1980, Ser. No. 155,958**
**Int. Cl.³ G08B *3/10***
**U.S. Cl. 340—384 E** **9 Claims**




1. An electronic sounder for producing a raucous loud sound with minimum supplied power comprising:

a first piezoelectric transducer for producing audible sounds having a first frequency in the audible frequency range;

a second piezoelectric transducer for producing audible sounds having a second frequency in the audible frequency range different than said first frequency by an amount to provide a predetermined audible beat note difference between the first and second frequencies;

a low power solid state circuit coupled to said piezoelectric transducers and operative to energize the transducers;

a power source for providing power to said solid state circuit, including a battery and a current limiting circuit, said current limiting circuit including means for providing power to said solid state circuit only when said current limiting circuit is connected to said battery; and

means for selectively connecting the battery to the current limiting circuit to energize the sounder.

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## 4,303,909
## ELECTRONICALLY ALARMED LOCK

**Franklin J. Martin, Carson City, Nev., assignor to James A. Martin, Carson City, Nev., a part interest**

**Filed Oct. 18, 1979, Ser. No. 85,922**
**Int. Cl.³ E05B *45/10*; G08B *13/08***
**U.S. Cl. 340—543** **11 Claims**

1. An electronically alarmed lock comprising:

a mechanical lock structure including a lock body, cylinder means rotatably mounted within said lock body, said cylinder means having a key slot formed therein;

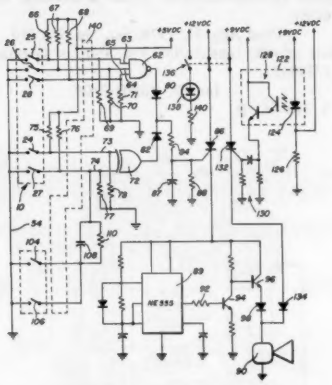
a key having a shank adapted to fit into said key slot, said shank having defined thereon a plurality of coded sections;

sensor means mounted on said lock body and including a plurality of code sensing elements with one of said code sensing elements being operatively associated with each one of said coded sections;

decoding circuit means operatively connected to said sensor means for decoding said coded sections, said decoding circuit means including a plurality of logic gates, each of said logic gates having an input connected from said sensor means;

biasing means connected to said logic gate inputs for maintaining said inputs at a high voltage level, said biasing means being located physically near said lock body, said logic gates being located physically remote from said lock body;

a cable extending between and connecting said biasing means and said logic gates; and




alarm means operatively connected to said decoding circuit means for producing an alarm in response to all but certain predetermined decoded signals.

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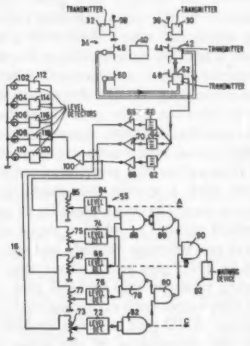
## 4,303,910
## DETECTION SYSTEM

**John D. McCann, Abingdon, England, assignor to Parmeko Limited, Leicester, England**

**Filed Apr. 25, 1978, Ser. No. 899,773**
**Claims priority, application United Kingdom, Apr. 28, 1977, 17749/77**
**Int. Cl.³ G08B *13/14, 13/24***
**U.S. Cl. 340—572** **21 Claims**




1. A method of monitoring the position in a surveillance zone of an electromagnetic wave receptor reradiator with signal mixing capability, comprising the steps of radiating simultaneously first and second energy fields through said zone for causing said receptor reradiator to radiate at least one reply signal which is a function of energy fields and of the position of the receptor reradiator in the zone and wherein said energy fields are established respectively from spaced apart locations adjacent the edges of said zone, said first energy field is produced by a first high frequency signal and said second energy field is produced by a second high frequency signal of a different frequency to said first high frequency signal; detecting in said zone the presence of said reply signal; and indicating the

position of the receptor reradiator in the zone and triggering an alarm in response to the detection of said reply signal.

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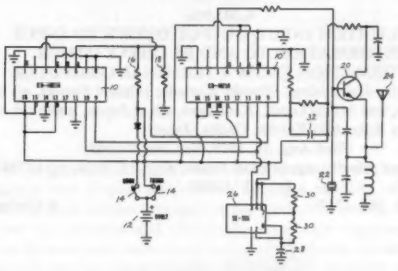
**4,303,911**

## REMOTE CONTROL DIGITALLY ENCODED ELECTRONIC SWITCH

**Timothy P. Hulick, 1280 Southfield Pl., Virginia Beach, Va. 23452**

**Filed Jul. 30, 1979, Ser. No. 61,946**
**Int. Cl.³ H04B 7/00**
**U.S. Cl. 340—825.69** **1 Claim**



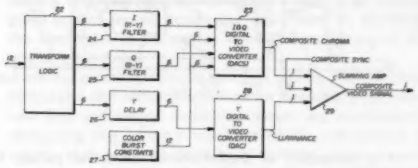
1. A switch mechanism actuated by a remotely transmitted binary digital code of a multiple number of parts in a specific sequence and each of a logic zero or a logic one value, said switch mechanism comprising a remote transmitter and a receiver means and a decoder, said transmitter including oscillator means for providing a carrier signal and actuator means for causing actuation of said oscillator means in response to the code part sequence to produce a signal pulse for each logic one code part with the oscillator means being turned on and off for selected durations whereby said signal pulses and the absence thereof constitute code bits of logic one and logic zero values respectively, said receiver means for receiving said code bits from said transmitter and relaying said bits to said decoder, said decoder including a switch actuator and means for receiving selected ones of said code bits from said receiver and converting said selected code bits through gating means into an actuating pulse to actuate said switch actuator, said receiver including a voltage comparator having a negative input and a positive input and an output, said output connected to said decoder, a first diode having its cathode connected to the comparator positive input and its anode connected to receive said code bits transmitted from said transmitter, a second diode having its cathode connected to said comparator negative input and its anode connected to receive said code bits transmitted from said transmitter, the voltage drop across said first diode being less than the voltage drop across said second diode whereby the positive input of the comparator will be at a voltage greater than the negative input of the comparator to provide a logic one input into the decoder for each logic one input into the comparator independent of the code bit voltage strength at the comparator inputs, a first capacitor associated with the cathode of said first diode and a second capacitor associated with the cathode of said second diode, said first capacitor having a capacitance less than the capacitance of said second diode whereby the transition between logic one and logic zero bits at said diodes causes said second capacitor to assume a logic zero condition after the first capacitor thereby providing a voltage at the comparator negative input and a logic zero input into the decoder.

**4,303,912**

## DIGITALLY CONTROLLED COMPOSITE COLOR VIDEO DISPLAY SYSTEM

**Irvin G. Stafford, Carlsbad, and Charles L. Seitz, San Luis Rey, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.**

**Filed May 19, 1980, Ser. No. 151,134**
**Int. Cl.³ G06F 3/153**
**U.S. Cl. 340—703** **15 Claims**




1. A color video display system comprising:

transformation means to receive a plurality of digital codes representing base colors to be displayed and having a plurality of outputs on which are placed digital signals representing differences between at least two of said base color values and a luminance value; and

digital-to-video converter means coupled to said transformation means and adapted to provide outputs representing phase-encoded signals of said transformation outputs.

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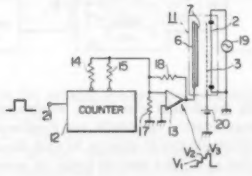
**4,303,913**

## FLUORESCENT DISPLAY DEVICE AND DISPLAY APPARATUS USING THE SAME

**Takao Tohda, Ikoma; Tsuneharu Nitta, Katano; Yoji Fukuda; Tomizo Matsuoka, both of Neyagawa, and Ziro Terada, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Aug. 6, 1979, Ser. No. 63,701**
**Claims priority, application Japan, Aug. 25, 1978, 53-104035; Aug. 25, 1978, 53-104036; Aug. 25, 1978, 53-104041**
**Int. Cl.³ G06F 3/14**
**U.S. Cl. 340—704** **5 Claims**




1. A fluorescent display device emitting lights of different colors when excited by low energy electrons accelerated by different voltages, said device comprising at least one phosphor screen composed of a mixture of a $SnO_2$: Eu phosphor with at least one of the cathodoluminescent phosphors having different emission spectra and different excitation properties from $SnO_2$: Eu phosphor.

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**4,303,914**

## VISUAL DISPLAY INPUT DEVICE

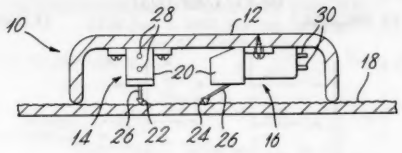
**Ian Page, Romford, England, assignor to National Research Development Corporation, London, England**

**Filed Mar. 2, 1979, Ser. No. 17,144**
**Claims priority, application United Kingdom, Mar. 6, 1978, 8791/78**
**Int. Cl.³ G08B 5/36**
**U.S. Cl. 340—706** **9 Claims**

1. A visual display input device for producing a signal repre-

senting a direction of motion to be reproduced in said display comprising:

sensing means adapted for hand-controlled motion over a plane surface, the sensing means being responsive to the texture of the surface during such motion in either direction along a selected axis to produce said signal consisting




of a succession of unidirectional electrical pulses, the polarity of the pulses being indicative of the direction of motion; and

means for maintaining said sensing means in a fixed orientation with respect to said surface so that said sensing means is insensitive to pressure normal to said surface.

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**4,303,915**

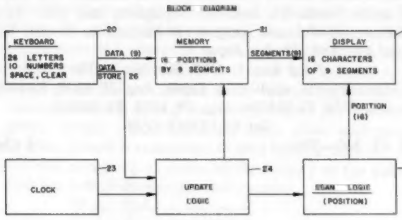
**SILENT COMMUNICATOR**

**George D'Angelo, 2649 Tronero Way, Rancho Cordova, Calif. 95670, and Michael Cannon, 1440 29th Ave., Oakland, Calif. 94601**

**Continuation of Ser. No. 825,920, Aug. 19, 1977, abandoned. This application Jul. 11, 1979, Ser. No. 56,706**

**Int. Cl.³ G06F *3/14***

**U.S. Cl. 340—711** **9 Claims**




1. A portable hand-held electronic alphanumeric display device for communication of words and numbers comprising:

means to provide electrical energy to said device;

keyboard means to input a desired letter or numeral into said device;

means to encode said input letter or numeral to provide a data input into said device;

memory means to store said data input;

scan logic means to remove said data input from said memory means and present said data input sequentially as data output from said device;

means to display said data output;

a unitary logic means to both update the display with a new character and to cause the previously displayed characters to shift one position to the left;

a clock operatively connected to said scan logic, memory and unitary logic, wherein the means to update the display and shift characters leftwardly is logic means activated during the refreshing of a multiplexed display to permit replacement of a character in memory, which character is visualized in the leftmost position of the display, said means being responsive to the keyboard activation;

said means also desynchronizing the scan and memory timing when activated to thereby cause the character in the oldest memory position to be replaced, and to be displayed in the rightmost position of the display while shifting the visual position of each previously displayed character to the next leftwardly location in the display and;

enclosure means to substantially enclose said power supply means, encoding means and memory means and circumferentially enclose said input means and display means so that said input means and display means are functionally visible to a person operating said device.

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**4,303,916**

**MULTI-ITEM INPUT/OUTPUT DEVICE TO INPUT INFORMATION TO AND RETRIEVE OTHER INFORMATION FROM A TERMINAL COMPUTER**

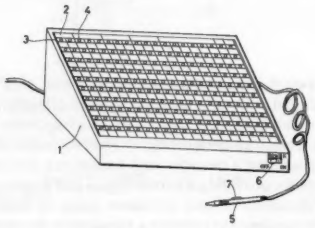
**Mitsuhiro Hakaridani; Hiroshi Kamada; Hitoshi Suzuki, all of Nara, and Mikio Osaki, Kashihara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Aug. 31, 1979, Ser. No. 71,669**

**Claims priority, application Japan, Aug. 31, 1978, 53-107991**

**Int. Cl.³ G06F *3/14***

**U.S. Cl. 340—712** **6 Claims**




1. A multi-item input/output device for use in combination with an external memory means, comprising:

a sheet bearing a multiplicity of items;

a display element array on said sheet including a plurality of light-emitting display elements, each of said display elements corresponding to a respective one of said multiplicity of items on said sheet;

a light pen carrying a light sensor and a switch, said light pen developing output signals when said light sensor intercepts the light emitted from a corresponding one of said display elements;

a scan control for sequentially scanning said display element array in response to an input signal from said switch;

an output control for converting said output signals from said light pen into code signals corresponding to the respective display element, said code signals energizing said external memory means for recalling information therefrom related to the item associated with the corresponding one of said display elements;

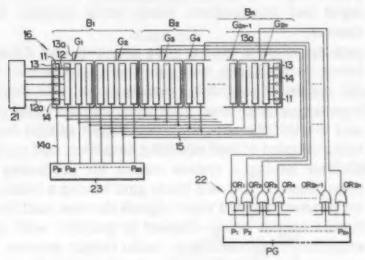
an input control for receiving said information from said external memory means and developing an output signal in response thereto; and

a display control means responsive to said output signal from said input control for enabling and disabling said display element array according to said information received from said external memory means, said display element array serving as a sequentially scanned display array when a specific item is selected by said light pen, and serving as a display means of said information recalled from said external memory means.

## 4,303,917
## FLUORESCENT DISPLAY DEVICE

Takao Kishino; Fumio Ichihara, and Nobuo Yamaguchi, all of Mobara, Japan, assignors to Futaba Denshi Kogyo Kabushiki Kaisha, Mobara, Japan

Filed Dec. 20, 1978, Ser. No. 971,568
Claims priority, application Japan, Dec. 28, 1977, 52-157322
Int. Cl.[3] H01J *17/48*
U.S. Cl. 340—772 8 Claims

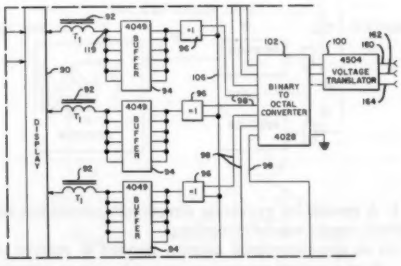


1. A fluorescent display device comprising a display tube section, said display tube section having a plurality of phosphor-coated anodes arranged in the form of a matrix having rows and columns and electrically connected together on a row-by-row basis, said anodes being grouped into a plurality of groups each having a plurality of the anodes, primary control electrodes provided opposite to said anodes, one for each group, secondary control electrodes separately provided opposite to said anodes and between said primary control electrodes and said anodes, one for each column, said groups being grouped into a plurality of blocks each containing at least two groups, and said secondary control electrodes being provided so that those disposed opposite to the corresponding columns of said blocks are electrically connected together by control-electrode wires.

## 4,303,918
## GAS PANEL WITH IMPROVED DRIVE CIRCUITS

Michael G. Reagan, Enterprise, and Bruce Pelkey, Longwood, both of Fla., assignors to NCR Corporation, Dayton, Ohio

Filed Jan. 21, 1980, Ser. No. 113,942
Int. Cl.[3] G06F *3/14*
U.S. Cl. 340—778 14 Claims




1. A control circuit arrangement for a gas-discharge device having a plurality of individual cells in which each cell has a pair of insulated electrodes defined by respective first and second conductors comprising:

a source of low level voltage pulses insufficient to discharge the electrodes in a cell;

first switching means adapted to couple said low level voltage pulses to said first conductor for supplying said voltage pulses to one of said electrodes when operated;

second switching means adapted to couple said low level voltage pulses to said second conductor for supplying said voltage pulses to the other of said electrodes when operated;

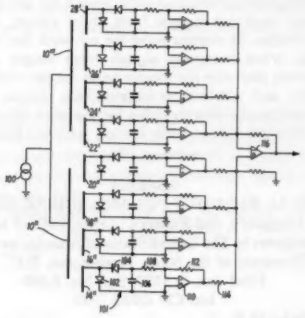
a transformer member having its primary windings coupled to said low level voltage source and its secondary windings coupled in series to said second conductor, said secondary windings adapted to supply a high level voltage pulse to said second conductor insufficient to discharge the electrodes in the device upon the energizing of the primary windings;

and control means coupled to said first and second switching means and said primary windings for alternately operating said first and second switching means and continuously energizing the primary windings of the transformer to supply said low and high level voltage pulses to said conductors, whereby the voltage pulses applied to said electrodes are sufficient to effect discharge therebetween.

## 4,303,919
## NON-CONTACTING DEVICE FOR SENSING MULTI-COMPONENT MOTION

John Dimeff, 5346 Greenside Dr., San Jose, Calif. 95127

Filed Dec. 4, 1978, Ser. No. 966,017
Int. Cl.[3] G08C *19/10*; A61C *19/04*
U.S. Cl. 340—870.37 11 Claims



1. Apparatus for sensing multicomponent motions between two parts comprising

a least a first conductive element,

a plurality of second conductive elements, means for independently connecting the first element to one of the two parts and the second elements to the other of the two parts and with the first element being closely spaced from, but not in electrical contact with each of the second elements and further being initially aligned with them,

an electric oscillator for generating an oscillating voltage, means for applying the oscillating voltage between the first element on the one hand, and each of the second elements, on the other hand,

and sensing means connected to each of the second elements and the oscillator and including detecting means for separately detecting changes in the potential between first element and each of the second elements as the two parts move relative to each other and thereby change the spacing and alignment between the first element and the second elements and for producing a first set of separate electrical signals representative of such changes, and means for algebraically combining the electrical signals in a plurality of predetermined combinations to generate a second set of electrical signals which are each representative of the separate linear and rotative orthogonal components of the relative motion between the two parts.

## 4,303,920
## RADAR SYSTEMS

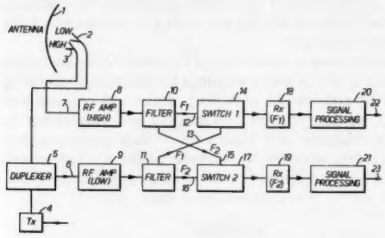
**Alan K. Mortimer, Shanklin, England, assignor to Plessey Handel und Investments AG, Zug, Switzerland**

**Filed Sep. 6, 1979, Ser. No. 73,241**

**Claims priority, application United Kingdom, Sep. 9, 1978, 36243/78; Sep. 25, 1978, 38030/78**

**Int. Cl.³ G01S *13/10***

**U.S. Cl. 343—17.1 R** **7 Claims**




1. A radar system including an antenna adapted to provide two beams, one of which covers a higher elevation than the other, producing means for producing two successive radar pulses, one of which is longer than the other, and switch means for selecting in dependence upon range the beam required and for selecting a predetermined pulse length for use therewith so that, when receiving signals from short ranges, said switch means provides the shorter pulse for use with the higher beam only, and, when receiving signals from longer ranges, the switch means provides the longer pulse for use with the lower beam only, and wherein, at intermediate ranges, the switch means provides the shorter pulse for use with the lower beam and provides the longer pulse for use with the higher beam.

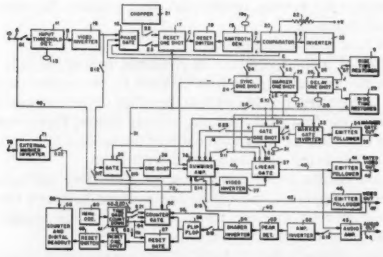
## 4,303,921
## DIGITAL READOUT PRF MEASURING DEVICE

**David L. Fitzgerald, and Robert C. Olsen, both of Indianapolis, Ind., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 2, 1970, Ser. No. 5,389**

**Int. Cl.³ G01S *7/36***

**U.S. Cl. 343—18 E** **8 Claims**



1. An electronic intelligence signal processing circuit for coupling into the video circuit of a radar receiver for displaying and digitally reading out the PRF count of known and unknown PRF emitters comprising:

an input of raw video PRF signals;

an adjustable threshold detector coupled to said input to detect frequency signals above the adjusted threshold and for standardizing each detected frequency signal, said detector having an output;

a phase lock loop coupled to the output of said threshold detector with an adjustable comparator therein to adjust the leading edge of a pulse, the trailing edge of which is positioned by a PRF signal, said phase lock loop having an output;

synchronous, marker, and delay one-shot multivibrator circuits coupled in common to the output of said phase lock loop, said marker and delay one-shots having width and delay controls therein, respectively, each one-shot having outputs;

a summing amplifier having a plurality of inputs and a system output, said synchronous and marker one-shot outputs being coupled to inputs thereof, and said raw video input and standardized video being coupled to inputs thereof;

a gate one-shot, a marker gate inverter, and a linear gate being intercoupled, said gate one-shot being coupled to the output of said delay one-shot, and said marker gate inverter and said linear gate being coupled to the output of said marker one-shot with one output of said linear gate being coupled to said summing amplifier, said marker gate inverter having a system output for producing marker pulses thereon and said linear gate having a system output for producing gated video signals thereon, said linear gate system output being coupled in parallel with an audio amplifier for producing an audio output thereon;

a counter and digital readout circuit means having inputs coupled to said audio amplifier output, to said delay one-shot output, and to said raw video input to count PRF signals and simulated signals for digital readout to provide a numerical count of the signals produced on said system outputs; and

selector switch means in said couplings for switching the circuit in various combinations of elements to different modes and switched positions to provide different types of information and test of known and unknown emitted PRF signals.

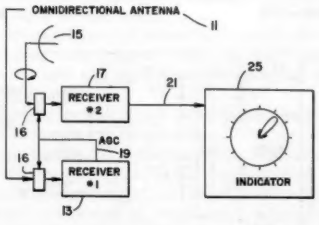
## 4,303,922
## METHOD FOR REDUCING ERRORS DUE TO SOURCE AMPLITUDE MODULATION IN A SEQUENTIAL AMPLITUDE COMPARISON DIRECTION FINDING SYSTEM

**David B. Hoisington, Carmel Valley, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 3, 1980, Ser. No. 126,240**

**Int. Cl.³ G01S *3/06***

**U.S. Cl. 343—114** **5 Claims**




1. A system for providing directional information about a radiant energy source comprising:

(a) an omnidirectional antenna adapted to receive signals from a radiant energy source and having an output;

(b) a spinning antenna adapted to receive signals from a radiant energy source and having an output;

(c) a first receiver connected to said output of said omnidirectional antenna and having an output signal;

(d) a second receiver connected to said output of said spinning antenna and having an output;

(e) a first voltage attenuator connected between said omnidirectional antenna and said first receiver, said first voltage

attenuator also receiving as input said output of said first receiver;

(f) a second voltage attenuator connected between said spinning antenna and said second receiver, said second voltage attenuator also receiving as input said output of said first receiver; and

(g) a display connected to said output of said second receiver for displaying directional information about said radiant energy source.

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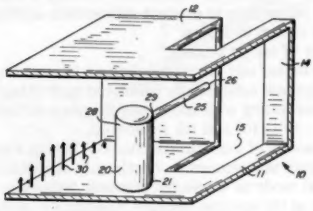
**4,303,923**

## PROBE LOOP FEED FOR TRANSVERSE EDGE WAVEGUIDE SLOT RADIATOR

**Charles R. Bitter, Jr., Scottsdale, and Terry D. Hafer, Tempe, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.**

**Filed Aug. 9, 1979, Ser. No. 65,299**
**Int. Cl.³ H01Q *13/10***
**U.S. Cl. 343—771** **6 Claims**




1. In a rectangular waveguide having broad walls and narrow walls, feed apparatus for a transverse edge waveguide slot comprising a conductor lying in a plane generally perpendicular to the longitudinal axis of the waveguide with a first portion connected adjacent an end thereof to a narrow wall adjacent the slot and extending generally perpendicularly inwardly therefrom, and a second portion connected adjacent an end thereof to a broad wall and extending generally perpendicularly inwardly therefrom.

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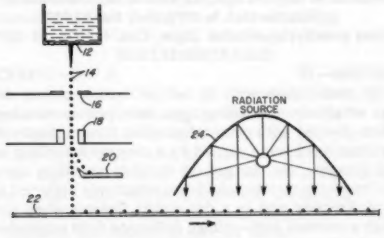
**4,303,924**

## JET DROP PRINTING PROCESS UTILIZING A RADIATION CURABLE INK

**Ainslie T. Young, Jr., Chillicothe, Ohio, assignor to The Mead Corporation, Dayton, Ohio**

**Filed Dec. 26, 1978, Ser. No. 973,120**
**Int. Cl.³ G01D *15/18***
**U.S. Cl. 346—1.1** **3 Claims**




1. A jet drop printing process utilizing a radiation curable jet printing ink, comprising:

ejecting at high speed from an orifice or orifices a radiation curable ink composition comprising a mixture of

(a) 5–80% of a low molecular weight multifunctional ethylenically unsaturated material which will polymerize and cure upon irradiation,

(b) 0–90% of a low molecular weight monofunctional ethylenically unsaturated material for viscosity control, cured film flexibility and bond strength,

(c) 0–15% of a reactive synergist to promote curing efficiency,

(d) 0.2–10% of a solvent dye colorant which does not interfere with the curing efficiency,

(e) 0.5–15% of an oil soluble salt to impart conductivity,

(f) 0.2–20% of a photoinitiator, and

(g) 0–30% of an organic polar solvent compatible with said mixture, said radiation curable ink having a viscosity of less than about 15 centipoise, a resistivity of approximately 50–5000 ohm-cm, and a surface tension of approximately 20–70 dynes/cm so that the stream of said ink composition issuing from said orifice or orifices breaks into droplets,

passing said stream of droplets through a charge ring to thereby differentially charge said droplets,

selectively deflecting said differentially charged droplets and directing them toward a paper substrate positioned so as to receive a portion of said differentially charged droplets,

depositing at least a portion of said droplets in a pattern on said paper substrate, and

passing said substrate having said pattern deposited thereon under a radiation source for a sufficient period of time to cure said radiation curable jet printing ink whereby there is formed on said substrate a pattern which is light absorptive at infrared wavelengths, smear resistant and waterproof.

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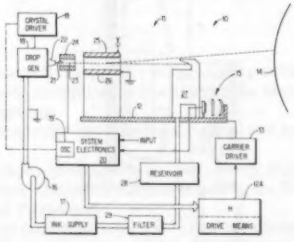
**4,303,925**

## METHOD AND APPARATUS FOR CONTROLLING THE POSITION OF PRINTED INK DROPLETS

**Wilmer P. Harbour, Jr., and Roderick S. Heard, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 27, 1979, Ser. No. 52,692**
**Int. Cl.³ G01D *15/18***
**U.S. Cl. 346—1.1** **20 Claims**




1. An ink jet printer including:

means to produce ink droplets spaced substantially uniform distances from each other;

a recording surface;

first means to cause relative movement between said producing means and said recording surface along a first axis;

and second means to cause relative movement between said producing means and said recording surface in a second direction substantially orthogonal to the first axis;

the improvement comprising:

means to dispose each printed ink droplet on said recording surface at any granular position in the second direction substantially orthogonal to the first axis and along the first axis in accordance with a reference position;

charging means to selectively charge to a selected magni-

tude each of the droplets to be printed on said recording surface;

deflection means to deflect each of the droplets to be printed in the second direction in accordance with the magnitude of the charge thereon;

storage means to store information concerning each character to be printed on said recording surface, the information including the magnitude of the voltage to said charging means for each printed droplet forming part of the character and the spacing of each printed droplet along the first axis from a reference position;

and voltage applying means to apply a selected voltage to said charging means for each of the droplets to be printed in accordance with the information in said storage means to enable each of the droplets to be printed to have the selected magnitude thereon for deflection by said deflection means in the second direction to the desired position on said recording surface;

and means to synchronize the relative movement between said producing means and said recording surface along the first axis with respect to the spacing of one of the droplets to be printed from a reference position along the first axis at selected time intervals solely in accordance with when there is a predetermined spacing between adjacent printed droplets.

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**4,303,926**

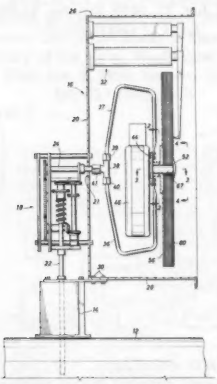
**CHART DRIVE MECHANISM**

**Charles F. Drake, 3245 Woodrow, Port Arthur, Tex. 77640, and Charles A. Rooth, Rte. 4 Box 76, Alvin, Tex. 77511**

**Filed Jan. 25, 1980, Ser. No. 115,429**

**Int. Cl.³ G01D** *9/00, 15/16, 15/26*

**U.S. Cl. 346—68** **4 Claims**



1. For use with a recording device cooperative with a fluid driven output shaft, a chart mounting plate supporting a plurality of recording charts and means for periodically removing the top chart, bracket means connecting the ouptut shaft and the mounting plate for rotating the chart supported by the plate at an angular rate proportionate to fluid volume flow, said bracket means comprising:

(a) a coupling;

(b) a pair of shaped arms adapted to extend around and connect from said coupling to the mounting plate; and

(c) adjustment means for concentrically aligning the recording charts relative to an axis for rotation.

**4,303,927**

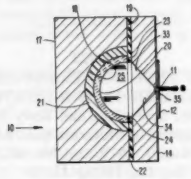
**APPARATUS FOR EXCITING AN ARRAY OF INK JET NOZZLES AND METHOD OF FORMING**

**Sherman H. Tsao, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 23, 1977, Ser. No. 780,572**

**Int. Cl.³ G01D** *15/18*

**U.S. Cl. 346—75** **61 Claims**



1. An apparatus for simultaneously exciting a plurality of pressurized ink streams to produce substantially uniform droplets in each stream including:

a plurality of ink jet nozzles;

means to mount said ink jet nozzles in a linear array so that their axes are substantially parallel to each other;

means cooperating with said mounting means to form an ink supply cavity for said ink jet nozzles;

and an element of piezoelectric material having a geometry that causes said element to vibrate only in a selected symmetrical mode at a selected resonant frequency when a voltage at the selected resonant frequency is applied, said element being disposed adjacent said cavity to periodically produce pressure waves in the ink within said cavity when said element vibrates at the selected resonant frequency in the selected symmetrical mode with the amplitude of each pressure wave being substantially uniform at the entrance of each of said ink jet nozzles to simultaneously excite the ink stream in each of said ink jet nozzles periodically to produce the ink droplets from each of the streams with the ink droplets of each of the steams being of substantially uniform size and each of the streams having substantially the same break-off point.

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**4,303,928**

**PRINTER HEAD ASSEMBLY FOR AN INK JET SYSTEM PRINTER OF THE CHARGE AMPLITUDE CONTROLLING TYPE**

**Kiyoshi Sugiyama; Masaharu Matsuba, both of Yokosuka; Fusao Iwagami, Higashiosaka, and Khoki Fukumoto, Yamatokoriyama, all of Japan, assignors to Nippon Telegraph & Telephone Public Corp., Tokyo and Sharp Kabushiki Kaisha, Osaka, both of, Japan**

**Continuation of Ser. No. 839,392, Oct. 4, 1977, abandoned. This application Oct. 9, 1979, Ser. No. 82,885**

**Claims priority, application Japan, Oct. 4, 1976, 51-119700**

**Int. Cl.³ G01D** *15/18*

**U.S. Cl. 346—75** **18 Claims**

1. In combination with an ink jet system printer of the charge amplitude controlling type, said printer emitting ink droplets charged with print information from a printer head, said printer head being carried by a carriage travelling in the lateral direction, the charged ink droplets travelling toward a record receiving member and being selectively deflected in the vertical direction and in a dot matrix fashion when passing through a constant high-voltage deflection field established by a pair of deflection electrodes, thereby recording desired symbols on said record receiving member, said printer head comprising:

housing means, having a longitudingal axis, for protectively enclosing various components of said ink jet system printer head within said housing means, said housing means having an end wall means covering a first end of

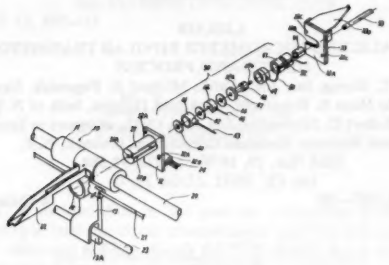
said housing means and a peripheral wall means attached to said end wall means for protectively enclosing the various components of said ink jet system printer;

an opening formed in said end wall means;

nozzle means enclosed within the peripheral wall means of said housing means for emitting ink liquid therefrom, said ink liquid being emitted through said opening formed in said end wall means;

vibrator means enclosed within the peripheral wall means of said housing means for exciting said nozzle means to form said ink droplets having a given frequency of emittance, said vibrator means being attached to said nozzle means;

charging electrode means enclosed within the peripheral wall means of said housing means for charging said ink droplets emitted from said nozzle means in accordance with said print information, said ink droplets having a predetermined charge amplitude;



guide slit means formed along the longitudinal axis of said housing means for providing access to said nozzle means, said vibrator means, and said charging electrode means to guide the installation of said nozzle means, said vibrator means and said charging electrode means along predetermined positions within said housing means; and

plate means attached to a second end of said housing means for tightly compressing and holding said nozzle means, said vibrator means and said charging electrode means in secure contact with each other along said longitudinal axis of said housing means, said nozzle means, said vibrator means, and said charging electrode means being unattached to said peripheral wall means of said housing means and being spaced a certain distance therefrom to permit such compressing by said plate means.

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**4,303,929**

## AIR PURGING PUMP FOR INK JET PRINTERS

**Thomas W. Blanck, Nicholasville, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 4, 1980, Ser. No. 156,304**

**Int. Cl.³ G01D** *15/16*

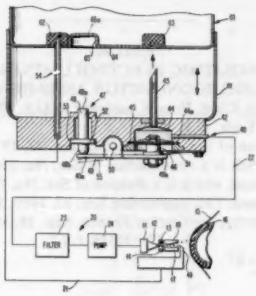
**U.S. Cl. 346—140 R** **12 Claims**

1. In an ink system for an ink jet printing apparatus having a replaceable ink bottle ink supply, and a receptacle for receiving the ink bottle for coupling thereof to the ink system of said printer by an ink supply line, an improved apparatus for inhibiting air entry into said ink supply line occurring during ink bottle changes, said improved apparatus comprising:

first means in said receptacle for providing fluid communication with the interior of said ink bottle;

an air purging pump intermediate said first means and said ink supply line;

pump actuator means coupled to said pump and actuable by entrance and egress of said bottle into and out of said receptacle, said air purging pump operable for withdrawing ink and air into said first means upon actuation of said pump by a bottle egressing said receptacle, and for pumping said ink and air back into a bottle upon entrance of said



bottle into said receptacle thereby inhibiting air bubbles in said ink supply line due to ink bottle changing.

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**4,303,930**

## SEMICONDUCTOR DEVICE FOR GENERATING AN ELECTRON BEAM AND METHOD OF MANUFACTURING SAME

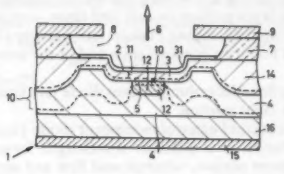
**Gerardus G. P. Van Gorkom, and Arthur M. E. Hoeberechts, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 12, 1979, Ser. No. 84,041**

**Claims priority, application Netherlands, Jul. 13, 1979, 7905470**

**Int. Cl.³ H01L** *29/90*

**U.S. Cl. 357—13** **14 Claims**



1. A semiconductor device for generating an electron beam by avalanche multiplication across a reverse biased P-N junction, comprising:

a semiconductor body having a surface, said body comprising:

a surface-adjoining N-type conductivity region; and

a P-type conductivity region adjoining the N-type region, said P-type and

N-type regions forming a P-N junction therebetween, said P-N junction having at least a portion which (a) is substantially parallel to the surface of the semiconductor body and (b) has a lower breakdown voltage than at other portions of the junction;

an electrically insulating layer on the surface of the semiconductor body, said layer having an aperture therethrough over at least the portion of the P-N junction which is parallel to the surface and which has a lower breakdown voltage; and

an accelerating electrode provided on the insulating layer at the edge of the aperture;

wherein the portion of the P-N junction having a lower breakdown voltage is separated from the surface of the semiconductor body by the N-type region, said N-type region having a thickness and dopant concentration such that at the breakdown voltage a depletion region around

the reduced breakdown voltage portion of the P-N junction is separated from the surface by a nondepleted surface layer which is sufficiently thin to pass the generated electrons.

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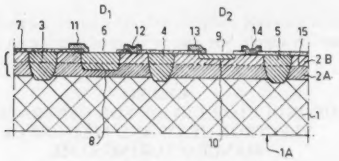
## 4,303,931
## MONOLITHIC ELECTROLUMINESCENT SEMICONDUCTOR ASSEMBLY

**Michel Gaffre, Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 863,456, Dec. 22, 1977, Pat. No. 4,198,251, which is a continuation of Ser. No. 836,607, Sep. 26, 1977, abandoned, which is a division of Ser. No. 721,289, Sep. 8, 1976, abandoned. This application Sep. 27, 1979, Ser. No. 79,604**
**Claims priority, application France, Sep. 18, 1975, 75 28632**
**Int. Cl.³ H01S *3/17***
**U.S. Cl. 357—17** **7 Claims**




1. A monolithic electroluminescent semiconductor assembly comprising

a semiconductor substrate,

a homogeneous epitaxial semiconductor layer on said semiconductor substrate and being of the same semiconductor compound as said substrate, said semiconductor layer comprising a first layer portion on said semiconductor substrate having a first impurity doping concentration and a second layer portion on said first layer portion having a second impurity doping concentration lower than that of said first impurity concentration and of the same impurity type,

at least one first electroluminescent diode junction formed in said first layer portion,

at least one second electroluminescent diode junction emitting radiation of a different wavelength formed in said second layer portion, wherein said first and second diode junctions radiate independently, and

a plurality of insulating partitions separating said first and second diode junctions.

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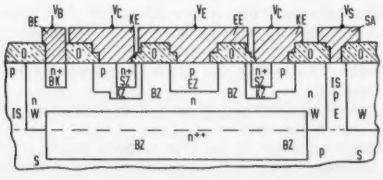
## 4,303,932
## LATERAL TRANSISTOR FREE OF PARISITICS

**Rolf Johannsen, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Aug. 10, 1979, Ser. No. 65,650**
**Claims priority, application Fed. Rep. of Germany, Aug. 17, 1978, 2835930**
**Int. Cl.³ H01L *27/04, 29/72***
**U.S. Cl. 357—48** **12 Claims**




1. In a monolithic integrated circuit, the combination comprising a substrate of semiconductor material, an epitaxial layer of one conductivity type on one major surface of said substrate, said substrate being of a second conductivity type, a buried layer of said one conductivity type formed partially in said epitaxial layer and partially in said substrate, a lateral transistor in said epitaxial layer which includes an emitter zone of said second conductivity type above said buried layer, a base zone of said first conductivity type abutting said emitter zone, said base zone also located above said buried emitter zone, and a collector zone abutting said base zone, said emitter, base and collector zones forming said lateral transistor, a protective zone of said first conductivity type formed in said collector zone of said lateral transistor and displaced from the center of said collector zone in the direction toward said emitter zone and which protective zone serves as the collector of an inverse vertical transistor whose emitter is provided by said buried layer, base, emitter and collector electrodes with said collector electrode making electrical contact with said collector zone and said protective zone.

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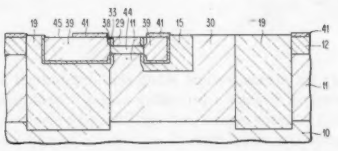
## 4,303,933
## SELF-ALIGNED MICROMETER BIPOLAR TRANSISTOR DEVICE AND PROCESS

**Cheng T. Horng, San Jose, Calif.; Michael R. Poponiak, Newburgh; Hans S. Rupprecht, Yorktown Heights, both of N.Y., and Robert O. Schwenker, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 29, 1979, Ser. No. 98,588**
**Int. Cl.³ H01L *27/04, 29/72***
**U.S. Cl. 357—50** **4 Claims**




1. In an integrated circuit device a planar self-aligned vertical bipolar transistor structure, said structure comprising:

a monolithic silicon substrate;

a shallow depth silicon epitaxial layer upon one surface of said substrate, said epitaxial layer having a substantially flat exposed top surface;

an emitter region formed in said epitaxial layer, said emitter region having an exposed essentially planar surface, said exposed planar surface of said emitter region being co-planar with said substantially flat exposed top surface of said epitaxial layer;

a base region formed in said epitaxial layer beneath said emitter region to provide a base-emitter junction, said base-emitter junction being essentially flat and having a predetermined area;

a collector region having a vertical portion formed beneath said base region to provide a base-collector junction and said collector region also having a lateral portion integrally formed with said vertical portion, said lateral portion of said collector region lying beneath and extending from said vertical portion of said collector region, said base-collector junction being essentially flat and having an area substantially equal to said predetermined area of said base-emitter junction and residing directly beneath and uniformly spaced from said base-emitter junction;

a polysilicon region of relatively high conductivity laterally encompassing said emitter region, said base region and said vertical portion of said collector region and said polysilicon region extending laterally above said lateral portion of said collector region;

insulator means including a vertical portion for electrically isolating said polysilicon region from said emitter region, said base-emitter junction, said vertical portion of said collector region and said base-collector junction, said

insulator means also including a lateral portion integral with at least a portion of said vertical portion thereof, said lateral portion of said insulator means electrically isolating said polysilicon region from said lateral portion of said collector region and,

said polysilicon region providing electrical contact to said base region.

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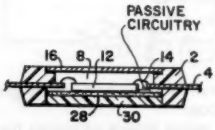
**4,303,934**

## MOLDED LEAD FRAME DUAL IN LINE PACKAGE INCLUDING A HYBRID CIRCUIT

**Robert M. Stitt, Tucson, Ariz., assignor to Burr-Brown Research Corp., Tucson, Ariz.**

**Filed Aug. 30, 1979, Ser. No. 71,400**
**Int. Cl.³ H01L** *23/02, 23/12, 23/16*
**U.S. Cl. 357—14** **1 Claim**




1. A molded dual in line package comprising a housing having at least one circuit comprising at least one semiconductor chip, said housing having first and second major surfaces and at least one cavity in said first major surface;

a first plurality of external electrically conductive leads;

a second plurality of internal electrically conductive leads coupled to said first plurality of leads and accessible from within said at least one cavity;

insulating support means within said housing and forming a lower surface of said at least one cavity upon which said at least one circuit is mounted, said at least one circuit being electrically coupled to said second plurality of leads;

passive circuitry on said support means; and

stainless steel metal cover means having epoxy means for sealing said at least one circuit in said at least one cavity, said passive circuitry is electrically coupled to said semiconductor chip.

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**4,303,935**

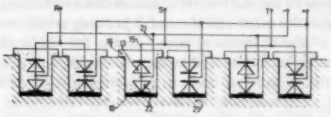
## SEMICONDUCTOR APPARATUS WITH ELECTRICALLY INSULATED HEAT SINK

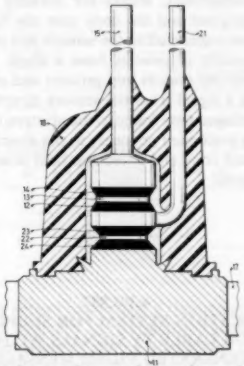
**Istvan Ragaly, Schwieberdingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Dec. 4, 1978, Ser. No. 965,743**
**Claims priority, application Fed. Rep. of Germany, Dec. 13, 1977, 2755404; Feb. 9, 1978, 2838342; Sep. 2, 1978, 2838412**
**Int. Cl.³ H01L** *23/32, 23/28, 23/02*
**U.S. Cl. 357—76** **24 Claims**

1. In a semiconductor arrangement having a single metallic base member (**11**) constituting a heat sink, a plurality of first semiconductor elements (**13**) mounted on said single metallic base member and electrical conductor means connected to at least one of said semiconductor elements for providing electrical contact thereto, the improvement comprising

electrical insulator means (**19**) having a high thermal conductivity interposed between said first semiconductor elements and said metallic base member for electrically insulating said single metallic base member from said semiconductor elements, said electrical insulator means comprising a plurality of second semiconductor elements connected to said first semiconductor elements, said sec-





ond semiconductor elements being always in the blocked state.

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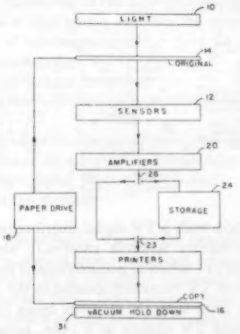
**4,303,936**

## STRUCTURE FOR AND METHOD OF REPRODUCTION

**Daniel L. Shaw, 20119 Violand, Roseville, Mich. 48065**

**Filed Dec. 26, 1978, Ser. No. 972,986**
**Int. Cl.³ H04N** *1/46*
**U.S. Cl. 358—77** **11 Claims**




1. A reproduction structure for making a two dimensional color copy of a two dimensional color original in a single passage of the original past a light source, comprising a light source directed onto the original as the original is driven past the light source, a plurality of sensors for sensing light from the light source modulated by the original and directed thereto and developing signals representative of intelligence on the original which it is desired to reproduce on copy material, amplifiers connected to the sensors for amplifying the signals, a plurality of printers responsive to the signals developed by the sensors for printing a two dimensional copy of the original in accordance with the sensor signals received by the printers

on copy material driven by the printers in a single passage in synchronism with the drive of the original, said printers including individual printing heads in communication with a reservoir of ink, each of which printing heads includes a cylindrical body open to the ink reservoir at one end and having a printing opening at the other end thereof, a printing armature extending axially of the cylindrical body, means for resiliently holding the printing armature within the printing opening in the other end of the cylindrical body to prevent ink from exiting therethrough, and solenoid means operably associated with the armature for moving the armature out of the printing opening on energizing of the solenoid to permit passage of ink from the reservoir therethrough, means for variably synchronously driving the original and the copy past the light source and printers, means connected to the sensors and printers for controlling a plurality of printers from a single sensor, storage means between the sensors and printers and means for selectively passing a signal from the sensors directly and through storage in a delayed time frame to the printers, said sensors and printers being positioned obliquely to the direction of travel of the original and copy and a vacuum hold down structure for the copy material.

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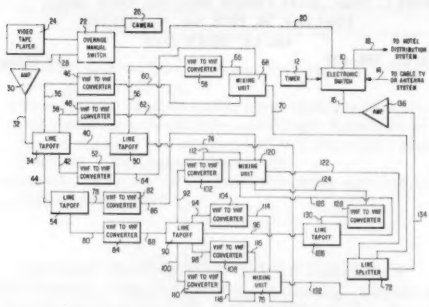
**4,303,937**

## COMMUNICATION SYSTEM FOR SUPPLEMENTING OFF-AIR OR CABLE TV SIGNALS WITH LOCALLY GENERATED VIDEO MESSAGES

**Tommy D. Cook, 302 Sutton Bridge Rd., Apartment #210, Gadsden, Ala. 35901**

**Filed Jul. 30, 1979, Ser. No. 61,857**
**Int. Cl.³ H04N 7/10**
**U.S. Cl. 358—86** **17 Claims**



1. In combination with a TV signal distribution system in a hotel or similar facility wherein externally originated TV signals of a plurality of different predetermined frequencies are fed to a plurality of TV receivers located in the rooms of the hotel or the like, each said TV receiver being capable of receiving one of said TV signals at a time, apparatus which comprises:

means for generating a local TV signal having a predetermined frequency within the hotel facility;

means for converting the frequency of said local TV signal into a plurality of local TV signals which respectively have a frequency corresponding to said plurality of different predetermined frequencies receivable by said plurality of TV receivers; and

means for selectively interrupting the reception of said externally originated TV signals on said plurality of TV receivers and for causing said plurality of local TV signals to be displayed thereon.

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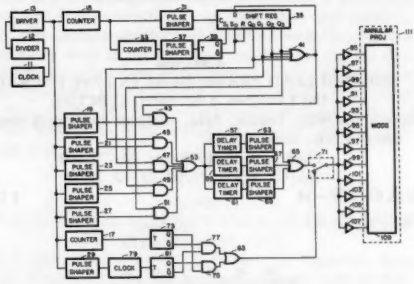
**4,303,938**

## PATTERN GENERATOR FOR SIMULATING IMAGE GENERATION

**Herbert Berke, Maitland, and John H. Allen, Winter Park, both of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 21, 1980, Ser. No. 114,002**
**Int. Cl.³ H04N 7/02**
**U.S. Cl. 358—139** **21 Claims**



1. A pattern generator for simulating image generation comprising, in combination:

clock generating means having an output for producing a clock signal, said clock signal having a plurality of clock pulses;

pulse shaping means having a quintet of inputs effectively connected to the output of said clock generating means and a quintet of outputs for providing, in response to each of the clock pulses of said clock signal, a quintet of data pulses, each of which has a predetermined pulse width;

gating means, having a clock input connected to the output of said clock generating means, a quintet of data inputs effectively and respectively connected to the quintet of outputs of said pulse shaping means and an output adapted for passing, in sequence, a set of the first of said quintet of data pulses, a set of the second of said quintet of data pulses, a set of the third of said quintet of data pulses, a set of the fourth of said quintet of data pulses, and a set of the fifth of said quintet of data pulses;

timing means having an input connected to the output of said gating means and an output adapted for delaying, in sequence, each set of said quintet of data pulses passed by said gating means for a first time interval, a second time interval, and a third time interval so as to form at the output thereof a first composite signal; and

checkerboard pattern generating means having an input connected to the output of said clock generating means and an output for providing at the output thereof a second composite signal.

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**4,303,939**

## HORIZONTAL STABILITY MEASUREMENT APPARATUS

**Joseph W. Stephens, Plainfield, and Kou-Jay Yang, Indianapolis, both of Ind., assignors to RCA Corporation, New York, N.Y.**

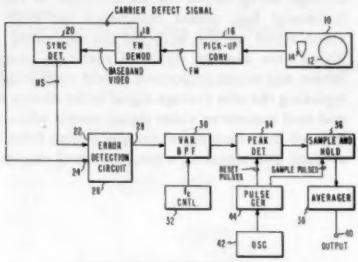
**Filed Aug. 11, 1980, Ser. No. 176,789**
**Int. Cl.³ H04N 5/13**
**U.S. Cl. 358—139** **18 Claims**

1. Stability measurement apparatus for detecting timebase errors of the horizontal synchronizing pulse component of a video signal, said apparatus comprising:

first means for separating horizontal synchronizing pulses from said video signal;

second means for producing an error signal representative of the timebase error of each pulse relative to a timebase reference having a period of substantially one horizontal line; and

third means for detecting and averaging peak values of a predetermined frequency component of said error signal




to provide an output signal manifestation representative of the frequency, amplitude and grouping of said timebase errors.

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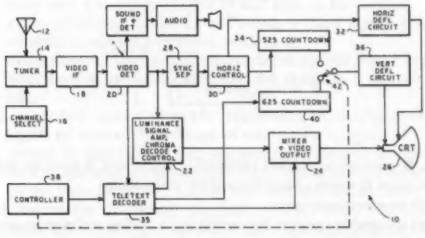
**4,303,940**

## RASTER MANIPULATED TELEVISION RECEIVER

**Walter S. Ciciora, Park Ridge, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.**

**Filed Jul. 14, 1980, Ser. No. 167,988**
**Int. Cl.³ H04N *7/08***
**U.S. Cl. 358—142** **7 Claims**




1. In a television receiver of the type having means for detecting video signals, means for decoding teletext information, a sync separator, and a vertical deflection circuit and a horizontal deflection circuit providing inputs to a cathode ray tube, the improvement comprising:

digital synchronization means for providing vertical synchronization signals in first or second modes, said first mode corresponding to display of signals in a first format, said second mode corresponding to display of signals in a second format, said digital synchronization means being coupled to the sync separator and to the means for decoding teletext information; and

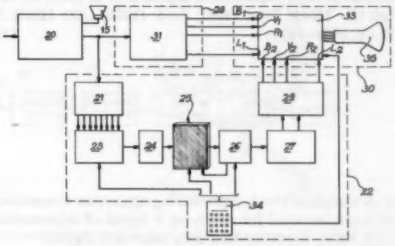
means for selecting one of said first and second modes for use in combination with the vertical deflection circuit, whereby teletext type signals are displayed in said second format.

**4,303,941**

## VIDEOTEX SYSTEM

**Bernard Marti, Noyal sur Vilaine; Alain Poignet, Rennes, both of France; Claude Fournier, 22, Allee Henri Bergson, 35100 Rennes, and Christian Roche, 13, rue Duguay-Trouin, 35530 Noyal sur Vilaine, both of France, assignors to Etablissement Public de Diffusion dit "Telediffusion de France", Montrouge; Claude Fournier, Rennes and Christian Roche, Noyal sur Vilaine, all of, France**

**Filed May 6, 1980, Ser. No. 147,136**
**Claims priority, application France, May 16, 1979, 79 12472**
**Int. Cl.³ H04N *7/08***
**U.S. Cl. 358—147** **12 Claims**



1. A videotex system comprising a transmission station and receiver stations, whereby the transmission station comprises:

means for composing or setting a magazine constituted by pages organised in rows of characters,

a data processing circuit incorporating means for coding the characters as digital signals grouped in data octets (8 bits) and means for forming control octets with 6th and 7th zero bits, constituted by codes indicating more particularly the headings and ends of pages, the headings and ends of rows, as well as visually display attributes, all the control and data octets incorporating a heavy weight bit which is an imparity bit, the circuit finally having a magazine store in the form of data octets inserted between the control octets,

a junction connected to the data processing circuit

a transmission multiplexer used for the insertion of data into the lines of television signals,

a modulation member,

each receiver station comprises:

a circuit for the reception and demodulation of the television signal,

a digital signal processing channel containing a digital junction followed by a digital signal decoder,

a videopicture signal processing channel

a visual display member

wherein

(A) in the transmission station: the data processing circuit comprises control signal formation means constituted, for each control, by a redundant sequence of control codes, each sequence being formed by at least two consecutive codes, whereof at least one is the conventional code corresponding to the control in question and the other or others having no significance liable to interfere with the conventional receivers and

(B) in certain of the receiver stations: an identification circuit is provided in the digital signal processing channel and between the digital junction and the decoder which utilises the redundancy of the control sequences

(a) for recognising in the sequences a particular control in spite of minor errors which can occur in this sequence and to restore a corrected control code corresponding to the conventional code which is then taken into account by the decoder

(b) and to recognise and indicate to the decoder that

certain control code sequences are seriously erroneous and must not be taken into account,

(C) the receiver stations which are not provided with an identification circuit and which process in a conventional manner the digital signals passing directly from the digital junction to the decoder.

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**4,303,942**

## SAMPLING CLOCK REPRODUCING APPARATUS

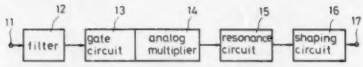
**Shin Fukuda, Hirakata, and Masayoshi Hirashima, Ibaraki, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Jun. 2, 1980, Ser. No. 155,382**

**Claims priority, application Japan, Jun. 6, 1979, 54-71522**

**Int. Cl.³ H04N** *7/04;* **H04L** *7/06;* **H03B** *1/00;* **H03K** *5/00*

**U.S. Cl. 358—147** **3 Claims**




1. A sampling clock reproducing apparatus comprising:

an input terminal for receiving a signal of information sent by being superimposed on a television signal,

a filter connected to said input terminal and having a passing frequency equal to a frequency of a pilot signal which is included in said signal of information and has a reference phase,

an analog multiplier for producing a square of said pilot signal, and

a resonance circuit having a resonance frequency of twice that of said pilot signal and connected to receive an output produced by said analog multiplier to make a resonance therewith, thereby to produce a sampling clock signal.

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**4,303,943**

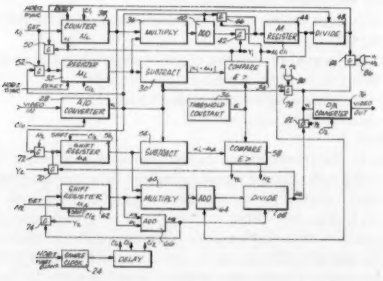
## ADAPTIVE ENHANCEMENT OF SIGNAL-TO-NOISE RATIO IN TELEVISION IMAGERY

**Curtis L. May, San Pedro, Calif., assignor to Magnavox Government & Industrial Electronics, Fort Wayne, Ind.**

**Filed Mar. 24, 1980, Ser. No. 133,606**

**Int. Cl.³ H04N** *5/21*

**U.S. Cl. 358—167** **13 Claims**




1. Apparatus for enhancing the signal-to-noise ratio of a video signal having a horizontal line rate and a vertical frame rate comprising:

means sampling the amplitude of the video signal at a rate substantially higher than the line rate, means responsive to each successive sample for generating a line average signal whose magnitude is the average of prior samples, means storing the line average signal, means comparing the next successive video signal sample with the stored line average signal, means replacing the stored line average signal with said next successive video signal sample when the magnitude of the sample differs from the stored line average signal by a predetermined amount, storing means storing a group of area average signals, one area average being stored for each sample in one complete horizontal line, means comparing the next successive video signal sample with the corresponding previously stored area average signal in said area sample storing means, and means responsive to said comparing means for replacing the area average signal in the storing means with said next successive video signal sample when the magnitude of the video signal sample differs from the stored average area signal by a predetermined amount.

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**4,303,944**

## TELEVISION RECEIVER COMPATIBLE WITH BOTH AMERICAN AND EUROPEAN SYSTEMS

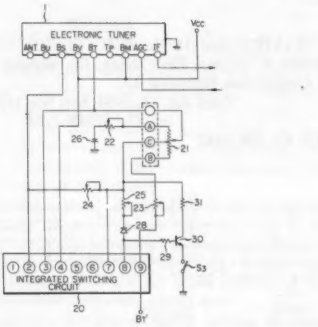
**Tsutomu Kitamura, Tokyo, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jun. 25, 1980, Ser. No. 163,211**

**Claims priority, application Japan, Jul. 2, 1979, 54-83630**

**Int. Cl.³ H04N** *5/48;* **H04B** *1/16*

**U.S. Cl. 358—191.1** **3 Claims**




1. A television receiver compatible with both American and European systems characterized by comprising

(a) an electronic tuner,

(b) a variable resistor for supplying a tuning voltage to said electronic tuner, the movable slider of said variable resistor being connected to a tuning voltage input terminal of said electronic tuner, said variable resistor having a center tap,

(c) a switch for selecting a relatively wide low-band in the VHF range or a relatively narrow high-band in the VHF range, and

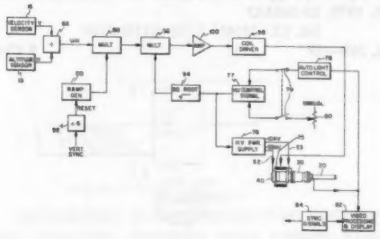
(d) a means which, when said switch is closed for the reception of the low-band VHF television channels, is turned on and connects a resistor to said center tap of said variable resistor, thereby dropping the voltage at said center tap and which, when said switch is opened, is turned off and disconnects said resistor from said center tap of said variable resistor, in the case of the reception of the high-band VHF television channels, said means keeping said resistor disconnected from said center tap of said variable resistor regardless of said switch being opened or closed.

**4,303,945**

## IMAGE MOTION COMPENSATION FOR A TV SENSOR SYSTEM

**James M. Fawcett, Ellicott City, and William F. Parrish, Baltimore, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 21, 1977, Ser. No. 779,664**
**Int. Cl.³ H04N *7/18***
**U.S. Cl. 358—222** **3 Claims**



1. Motion compensation apparatus for a TV sensor system adapted for movement relative to a target area to be viewed, comprising:

A. a TV sensor system including
(i) an imaging device section and
(ii) an image intensifier section coupled thereto;

B. said imaging device section being operable to receive an energy image of a scene being viewed to provide a video signal indicative thereof;

C. said image intensifier section including a photocathode which transforms an incident photon image of the viewed scene into an electron image;

D. first and second image intensifier high voltage electrodes;

E. a high voltage power supply connected to said electrodes for accelerating said electron image;

F. means for coupling said image to said imaging device section;

G. means for deriving a first signal indicative of the relative velocity, in a first predetermined direction, between said TV sensor system and said area to be viewed;

H. means for deriving a second signal indicative of the distance from said TV sensor system to said area to be viewed;

I. ramp generator means for providing a third signal whose amplitude periodically varies with time;

J. deflection coil means positioned relative to said image intensifier section to deflect said electron image in a first direction;

K. a control circuit operable to provide an output control signal to control the voltage of said power supply;

L. means for deriving a fourth signal proportional to the square root of said control signal, said fourth signal being indicative of the velocity of said accelerated electron image; and

M. means for combining said first, second, third and fourth signals for deriving a coil drive signal and applying said coil drive signal to said deflection coil means.

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**4,303,946**

## VIDEO STAND AND METHOD OF EXHIBITING INFORMATIONAL PROGRAMS

**Mac L. Berry, P.O. Box 20002, Salisbury, N.C. 28144**

**Filed Feb. 8, 1980, Ser. No. 119,729**
**Int. Cl.³ H04N *5/64***
**U.S. Cl. 358—254** **10 Claims**

1. A video exhibit stand comprising:

a housing having outer and inner walls and a vertically upwardly swinging closure;

a base in the form of an inverted dome for supporting said housing;

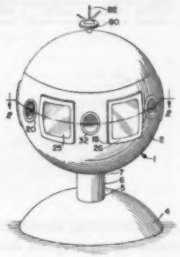
a standard secured to the base at one end thereof, and to the housing at the opposite end thereof;

a plurality of alternating larger and smaller openings within the walls of the housing and arranged around the periphery thereof;

a plurality of cathode ray tubes having inputs thereon supported within the housing and having the screens thereof secured within the larger openings;

audio speakers having inputs thereon supported within the smaller openings, said smaller openings alternating between the larger openings;

a video transmitter having output means thereon;



a four-way electronic signal splitter having input and output means thereon, said inputs connected to the outputs of the video transmitter whereby informational program signals are transmitted to the four-way electronic signal splitter;

cable means connecting the output of said four-way electronic signal splitter to the inputs of the cathode ray tubes; and

said four-way electronic signal splitter producing four distinct but identical informational signals which are conducted to the inputs of the cathode ray tubes where said informational programs appear on said screens.

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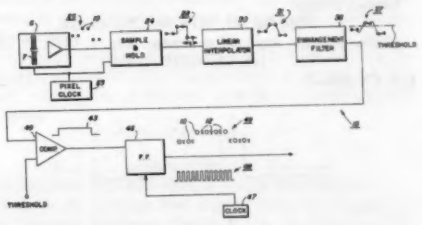
**4,303,947**

## IMAGE INTERPOLATION SYSTEM

**James C. Stoffel, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Continuation of Ser. No. 917,626, Jun. 21, 1978, abandoned.**
**This application Apr. 28, 1980, Ser. No. 144,710**
**Int. Cl.³ H04N *1/00, 7/12***
**U.S. Cl. 358—260** **17 Claims**



1. The method of handling data representative of an image in pixel form to provide an output image having increased resolution while reducing image date storage requirements and transmission bandwidth, the steps comprising:

(a) providing a minimal number of original image pixels representative of an image on a line by line basis;

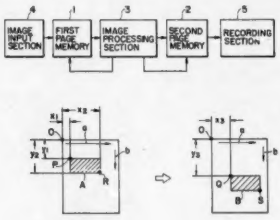
(b) interpolating extra image pixels from said original image pixels; and

(c) interpolating at least one additional line of image pixels from both said original image pixels and said extra image pixels to provide said output image with increased resolution.

## 4,303,948
## IMAGE TRANSCRIBING SYSTEM

Yoshio Arai; Hiroyuki Kataoka; Isao Suzuki, and Shozo Yokota, all of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Sep. 11, 1979, Ser. No. 74,459
Claims priority, application Japan, Sep. 14, 1978, 53-113318
Int. Cl.[3] H04M *1/04*
U.S. Cl. 358—287 6 Claims

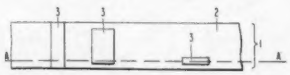



1. An image transcribing device comprising; an image input portion for scanning an original document for converting an image on the original document into binary binary information signals representing the image, a first page memory for storing said binary information signals, a second page memory, an image processing section for transferring the binary information stored in said first page memory at addresses corresponding to a predetermined region of the original document to the second page memory and stored at addresses corresponding to a predetermined transcribing region for a reproduced image, a recording section for copy reproducing the stored binary information of said second page memory on a recording sheet, means for observing the image on the original for selecting the predetermined region of the original document and for assigning a position on a recording sheet at which the image is to be transcribed, and means for generating addresses corresponding to said predetermined transcribing region from said assigned position.

## 4,303,949
## MAGNETIC RECORDING DEVICE FOR PROVIDING SECURITY RELATED INFORMATION

Roland Peronnet, Creteil, France, assignor to Societe Pyral, Creteil, France

Filed Jul. 31, 1979, Ser. No. 62,426
Claims priority, application France, Aug. 1, 1978, 78 22667
Int. Cl.[3] G11B *25/04*
U.S. Cl. 360—2 13 Claims



1. A magnetic recording device for providing security related information in a manner which inhibits forgery of the information; comprising:

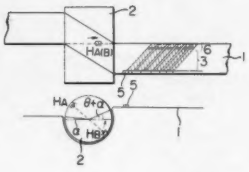
a magnetic recording base carrier in the form of a tape having substantially uniform thickness; and

a plurality of thickness increments, each having the same coercivity as said magnetic recording base carrier, forming zones on the magnetic recording carrier in which the thickness of the recording device differs from the average uniform thickness of the base carrier by an amount greater than 40% of the average uniform thickness of the base carrier, to thereby impart different magnetic properties to the recording device in the areas of said zones.

## 4,303,950
## HELICAL SCAN VIDEO TAPE RECORDER FOR RECORDING VIDEO AND AUDIO SIGNALS ON CONTIGUOUS TRACKS

Hiroshi Taniguchi, Hirakata; Osahiko Yano, Ibaragi; Chojuro Yamamitsu, Kawanishi; Sadafumi Kitamura, Neyagawa, and Masamitsu Ohtsu, Kadoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 12, 1979, Ser. No. 56,845
Claims priority, application Japan, Jul. 20, 1978, 53-89053; Aug. 29, 1978, 53-106143
Int. Cl.[3] H04N *5/78;* G11B *5/49*
U.S. Cl. 360—19 9 Claims

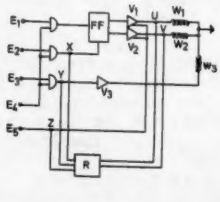


1. A magnetic recording and reproducing system of the type where a plurality of rotating magnetic heads record a television signal comprising video and audio signals on a magnetic medium as sequential discontinuous tracks, characterized in that the wrapping angle of said magnetic medium around a cylinder carrying said plurality of rotating magnetic heads is increased by an angle as compared with the conventional wrapping angle required for recording and reproducing the television signal; means for time compressing the audio signal; means including at least one of said plurality of rotating magnetic heads for recording the time compressed audio signal on the tracks laid down by said at least one magnetic head and extended by said increase in wrapping angle; means including said rotating magnetic heads for reproducing said television signal; and means coupled to said reproducing means for time expanding said time compressed audio signal to derive a continuous reproduced audio signal.

## 4,303,951
## DEVICE FOR COMPENSATING UNEQUAL WRITE FIELDS IN MAGNETIC DATA-STORAGE DEVICES, ESPECIALLY IN DISC MEMORIES

Joachim Hack, Ludwigshafen, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 28, 1979, Ser. No. 52,946
Claims priority, application Fed. Rep. of Germany, Jul. 26, 1978, 2832719
Int. Cl.[3] G11B *5/09*
U.S. Cl. 360—46 7 Claims




1. In a magnetic data storage apparatus, including a magnetic write head having two oppositely acting windings, a magnetic erase head and connections for receiving a plurality of electric command signals selectively rendering said heads effective,

an arrangement for compensating for an inequality between

the magnetic fields set up by said two windings, respectively, said arrangement comprising:

switching means for preselecting one of said windings in accordance with the sense of said imbalance, and

circuit means controlled by said command signals for supplying a compensating direct current to the winding preselected by said switching means while said write head is rendered effective.

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4,303,952

## RECORDING AND REPRODUCING SYSTEM

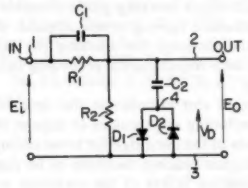
Chojuro Yamamitsu, Kawanishi; Ichiro Arimura, Kyoto, and Hiroshi Taniguchi, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd, Osaka, Japan

Filed Jun. 26, 1978, Ser. No. 919,298

Claims priority, application Japan, Jun. 29, 1977, 52-78154

Int. Cl.³ G11B *5/45, 5/02*

U.S. Cl. 360—65 9 Claims




1. A video signal recording and reproducing system in which a video signal to be recorded is passed through preemphasis means and subsequently angular-modulated so that it is recorded on a record medium, and in playback operation the video signal to be reproduced is angular demodulated and then deemphasized through deemphasis means, wherein:

said preemphasis means comprises a first non-linear preemphasis circuit having a frequency characteristic variable according to the amplitude of the video signal applied thereto for emphasizing the amplitude of high frequency components of the video signal to the extent of a first predetermined value, and a fixed preemphasis circuit connected to said non-linear preemphasis circuit for receiving and further emphasizing the amplitude of said high frequency components to the extent of a second predetermined value;

said deemphasis means comprises a fixed deemphasis circuit for deemphasizing noises of the reproduced signal to the extent of the substantially same value as the second predetermined value of said fixed preemphasis circuit, and a non-linear deemphasis circuit connected to said fixed deemphasis circuit for receiving the deemphasized output and further deemphasizing the amplitude of high frequency components of the reproduced signal to the extent of the substantially same value as the first predetermined value of said non-linear preemphasis circuit; said non-linear deemphasis circuit including an amplifier having an input terminal to which a demodulation signal is applied and an output terminal, and a negative feedback circuit for negatively feeding the output of said amplifier back to the input terminal of said amplifier.

4,303,953

## METHOD OF POSITIONING REPRODUCING ELEMENTS AND DEVICE FOR CARRYING OUT THE METHOD

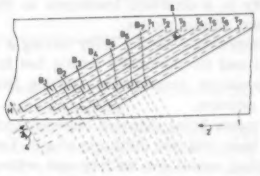
Hendrik J. Sanderson, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 18, 1979, Ser. No. 58,577

Claims priority, application Netherlands, Aug. 22, 1978, 7808639

Int. Cl.³ G11B *21/10, 21/12*

U.S. Cl. 360—78 18 Claims



1. A method of controlling the position of a pair of reproducing elements in an apparatus for reproducing signals recorded in a plurality of parallel tracks on a recording medium, said reproducing elements and said medium being arranged for movement relative to each other so that said elements consecutively read alternate tracks and the signals recorded in the tracks containing pilot signals such that the pilot signals from each pair of consecutively read tracks are spaced from each other by a predetermined, nominal time interval when the reproducing elements are spaced from each other by a predetermined, nominal distance in a direction transverse to the track direction, said method comprising the steps of:

detecting the pilot signals read from said tracks by said reproducing elements;

measuring the time interval between the pilot signals detected from each pair of consecutively read tracks;

determining the difference between said measured and nominal time intervals, said differance being indicative of the deviation of the distance between said reproducing elements in said transverse direction from said nominal distance; and

correcting the position of said reproducing elements relative to each other in the direction transverse to the track direction when said difference exceeds a predetermined amount.

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4,303,954

## CONTROL DEVICE FOR A TAPE RECORDER

Fritz Weisser, St. Georgen, Fed. Rep. of Germany, assignor to Dual Gebruder Steidinger GmbH & Co., St. Georgen, Fed. Rep. of Germany

Filed Mar. 6, 1980, Ser. No. 127,704

Int. Cl.³ G11B *15/00*

U.S. Cl. 360—90 4 Claims

1. A control device for a tape recorder having a drive means for fast forward winding and fast reverse winding of a magnetic tape resting on reel discs which are arranged alongside each other on a base plate, comprising

a capstan being mounted on the base plate,

a mount being movably mounted on the base plate in a direction of movement between an operating position and a rest position,

a pressing roller being mounted on said mount and cooperatively disposed relative to said capstan such that said

roller presses the magnetic tape against the capstan when the mount is in the operating position,

a pivot bearing being centrally disposed on said mount,

spring means acting on said mount for biasing said mount out of the operating position,

a T-shaped lever swingably supported on said mount around said pivot bearing,

said T-shaped lever includes two opposite arms and a third arm,

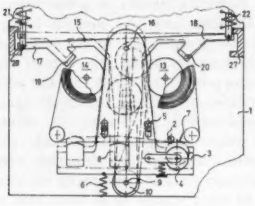
abutments fixed relative to said T-shaped lever,

said two opposite arms of said T-shaped lever under the action of said spring means and via said mount, abutting against said abutments, respectively, in said rest position and holding therewith said T-shaped lever in a neutral center position in which said two opposite arms lie substantially in a direction transverse to the direction of movement of said mount,

means comprising a setting lever having a neutral central position and for optionally setting fast forward and reverse positions, respectively, starting from the neutral central position,

coupling means being disposed between and coupling said setting lever and said third arm of said T-shaped lever,

said coupling means for holding said setting lever in the neutral central position when said T-shaped lever is not pivoted, and said coupling means for otherwise transmitting only a pivoting movement of said T-shaped lever to said setting lever such that said setting lever moves out of said neutral central position into said fast forward and reverse positions, respectively,



two electric solenoids each being operatively disposed to act on one of said two opposite arms of said T-shaped lever, respectively, a solenoid stroke of one of said solenoids, respectively, each being dimensioned such that when only one of said two solenoids is actuated a corresponding one of said two opposite arms is drawn away from a corresponding one of said abutments and said T-shaped lever pivots about the other of said abutments and by means of said T-shaped lever and said coupling means said setting lever is settable into said fast forward and reverse positions, respectively, and therewith said pivot bearing of said T-shaped lever and said mount are displaced to an extent only equal to approximately half the solenoid stroke, moving said mount and said pressing roller only about half the way from said rest position to said operating position,

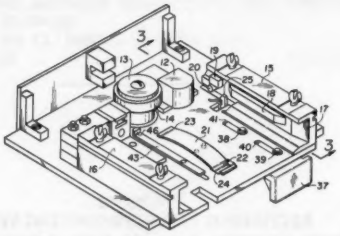
said mount and said pressing roller being in said operating position only with simultaneous actuation of and attraction of both said solenoids and said two opposite arms of said T-shaped lever substantially without pivoting thereof and thereby displacement of said pivot bearing and said mount.

**4,303,955**

## APPARATUS FOR SECURING AND RELEASING TAPE CARTRIDGES FROM TAPE DECKS

**Joel Kramer, Woodbury, and William D. Cohen, Huntington, both of N.Y., assignors to North Atlantic Industries, Inc., Hauppauge, N.Y.**

**Filed Feb. 25, 1980, Ser. No. 124,576**
**Int. Cl.³ G11B 5/78, 23/04**
**U.S. Cl. 360—93** **10 Claims**



1. Tape deck apparatus for receiving and positioning for data interchange standard tape cartridges housing tape reels and in which the leading edge includes a driven capstan to engage a driving capstan in the deck, and a tape exposing area to be brought into precision engagement with a recording head in the deck, the side edges carrying guide channels and latching notches, and reference bearing points adjacent the respective side edges of the cartridge for locating the tape in precise lateral position with respect to the recording head, the invention comprising:

means defining a slot chamber in the deck to receive the cartridge including edge guides to engage the respective side channels of the cartridge for loose sliding movement;

a pair of reference bearing members to be engaged by the reference bearing points of the cartridge when the cartridge is seated;

resilient means to engage one side of the cartridge to urge it in a direction normal to the plane thereof and against the reference bearing members; and

latch means to engage the cartridge in the said notches to force it forwardly to bring the driving and driven capstans into engagement, said latch means comprising a pair of pivot plates in the path of movement of the guide channels of the cartridge, said pivot plates being independently pivotally coupled to the tape deck, and link means to cross-couple the pivot plates, whereby the pivot plates are constrained to remain in phase upon insertion and withdrawal of the cartridge.

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**4,303,956**

## LOAD-SHARING TYPE MAGNETIC HEAD

**Akio Kobubu, Ibaragi, and Toshio Tanaka, Sayama, both of Japan, assignors to Agency of Industrial Science & Technology and Ministry of International Trade and Industry, both of Tokyo, Japan**

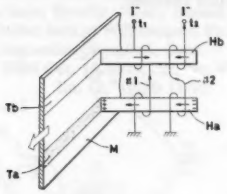
**Filed Sep. 20, 1979, Ser. No. 77,265**
**Claims priority, application Japan, Oct. 6, 1978, 53-122682**
**Int. Cl.³ G11B 5/20**
**U.S. Cl. 360—123** **5 Claims**

1. A load-sharing type magnetic head, comprising:

a plurality of mutually independent head cores; and

a plurality of serial drive lines each wound successively on the respective head cores to form coils on each head core, with the sequence of said coils on each head core differing in winding direction from that on any other head core in the whole system, whereby electric currents each having a polarity so determined that said coils on one selected head core produce magnetic fluxes in the same direction

are respectively supplied to all of said coils thereby causing one selected head core to be excited to an amply large




extent to consequently permit signals to be recorded in a selected one of tracks on a recording medium.

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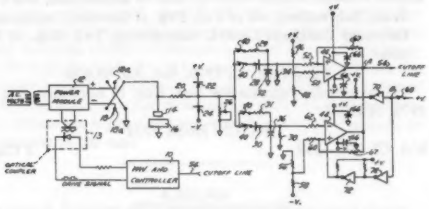
**4,303,957**

## GAP CONDITION SENSING CIRCUIT FOR ELECTRICAL DISCHARGE MACHINING POWER SUPPLY

**Oliver A. Bell, Jr., Statesville; Randall C. Gilleland, Troutman, and Davey J. Chance, Concord, all of N.C., assignors to Colt Industries Operating Corp, New York, N.Y.**

**Filed Jun. 27, 1979, Ser. No. 52,403**
**Int. Cl.³ H02H *3/20*; B23K *9/16***
**U.S. Cl. 361—88** **11 Claims**



6. A gap condition sensing network for use in an EDM protection system including a power module; a multivibrator operatively connected to said module for providing machining power pulse output therefrom to the EDM gap; a reversing switch operatively connected between the output of the power module and the gap for providing pulse output of negative or positive polarity thereto; wherein the improvement comprises, a gap voltage sensing network having a single input lead connected to the gap; a pair of branches coupled to the output of said lead; the first of said branches including a voltage sensing network and a first comparator, said comparator having the output of said gap voltage sensing network and a reference voltage network coupled to its two respective input terminals; said first comparator further having its output terminal connected to a cut-off signal terminal; a second branch substantially similar to the first branch but having a gap voltage sensing network operative responsive to opposite polarity signal to that of said first branch; said comparator of the second branch having its reference voltage and gap voltage network connected to its input terminals; said comparators both having their outputs connected to said cut-off signal terminal; and means for enabling the operation of one of said comparators whereby control cut-off signal is passed from such common terminal to reduce power output from the power module.

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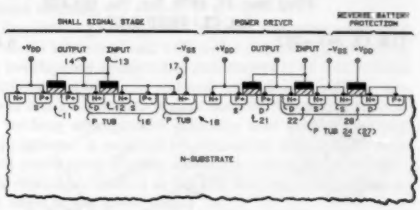
**4,303,958**

## REVERSE BATTERY PROTECTION

**Robert N. Allgood, Austin, Tex., assignor to Motorola Inc., Schaumburg, Ill.**

**Filed Jun. 18, 1979, Ser. No. 49,370**
**Int. Cl.³ H01L *27/04***
**U.S. Cl. 361—100** **7 Claims**




1. A reverse battery protection circuit for use on an integrated MOS circuit, comprising:

a first MOS transistor of a first consuctivity type and having a source electrode coupled to a first supply terminal, a drain electrode coupled to an output terminal of the MOS circuit, and a gate electrode, the source and drain electrode being formed in a second conductivity type substrate portion in contact with a substrate portion of the first conductivity type;

means for coupling said substrate portion of the first conductivity type to a second supply terminal of the MOS circuit; and

a second MOS transistor of the first conductivity type and having a source electrode coupled to the source electrode of the first MOS transistor, a drain electrode coupled to the second conductivity type substrate portion, and a gate electrode coupled to said second supply terminal of the MOS circuit to provide reverse battery protection to the circuit.

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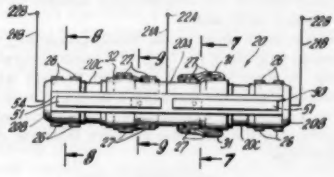
**4,303,959**

## FAIL SAFE SURGE ARRESTER SYSTEMS

**Charles A. Roberts, Rosedale, N.Y., and Raymond D. Jones, Cheam, England, assignors to TII Industries, Inc., Lindenhurst, N.Y.**

**Continuation of Ser. No. 843,320, Oct. 18, 1977, abandoned. This application Aug. 8, 1979, Ser. No. 64,779**
**Int. Cl.³ H02H *9/04***
**U.S. Cl. 361—124** **36 Claims**



1. An air gap surge arrester comprising:

a sealed laminar assembly having first and second layers of electrically conductive metallic material, a portion of said conductive layers being in overlapping relationship, and an intermediate insulating layer interposed between and bonded to said first and said second layers, said insulating layer having a predetermined aperture in the area of overlap between said conductive layers, whereby an air gap is established between said first and said second layers; and

means enveloping said laminar assembly for urging the respective layers of said laminar assembly towards one terminal of a device to be protected from an electric surge,

a second terminal of said device being electrically coupled directly to said urging means.

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**4,303,960**

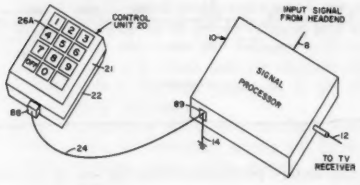
**ELECTROSTATIC DISCHARGE-PROTECTED SWITCH**

**Robert A. Sherwood, and Svein T. Nordberg, both of El Paso, Tex., assignors to GTE Products Corporation, El Paso, Tex.**

**Filed Dec. 31, 1979, Ser. No. 109,423**

**Int. Cl.³ H05F *3/02***

**U.S. Cl. 361—212** **6 Claims**




3. An electrostatic-discharge protected pressure actuated matrix switch including a plurality of individual switch elements that are spaced apart so as to be generally located in a common plane in a matrix configuration, said matrix switch comprising:

a pair of switch contact members associated with each of said individual switch elements that are in a prescribed area; at least some of said switch contact members being electrically connected through external electrical circuitry to a ground reference potential;

a first planar dielectric member that is flexible, that extends over the full breadth of the prescribed area, and which has one contact member of each switch element on one broad side thereof that is substantially parallel to the common plane;

first means supporting an other one of said contact members of each switch element facing and spaced a prescribed distance, in a prescribed direction orthogonal to the common plane, from an associated one contact member of the same switch element such that a pressure force directed in the prescribed direction and translated to a particular one contact member on said first dielectric member causes that particular contact member and at least an associated contact member to come into physical and electrical contact for closing the switch element;

second means which is a flexible planar electrically conductive member located proximate to the other side of said first dielectric member and continuously extending over the breadth of said first dielectric member having contact members on it; and

third means for directly electrically connecting said second means to ground, the body of a human operator supporting an electrostatic charge, and brought adjacent said second means for actuating a particular switch element, being discharged to ground through said second means for protecting the electrical circuitry from the electrostatic discharge.

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**4,303,961**

**USE OF GLOW DISCHARGE IN FLUIDIZED BEDS**

**Robert A. Frosch, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Theodore Wydeven, Sunnyvale, Calif.; Peter C. Wood, San Jose, Calif.; Edward V. Ballou, Mountain View, Calif., and Leroy A. Spitze, Morgan Hill, Calif.**

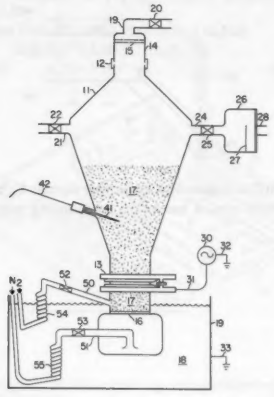
**Filed Oct. 26, 1979, Ser. No. 88,663**

**Int. Cl.³ H05B *5/02***

**U.S. Cl. 361—230** **8 Claims**

1. A process for the minimization of agglomeration of particles in a reaction chamber containing solid particulate material fluidized by a gas stream so as to produce a fluidized bed, said process comprising:

(a) positioning first and second electrodes external of and near said reaction chamber;



(b) applying radio-frequency power between said first and second electrodes to maintain a glow discharge in at least a part of said fluidized bed to dissipate electrostatic charges from the particulate material.

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**4,303,962**

**ELECTRICAL CONTACT ARRANGEMENT FOR A BATTERY-OPERATED INSTRUMENT**

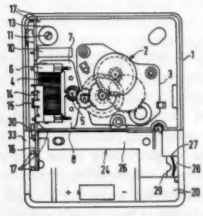
**Robert Wolber; Roland Maurer, both of Lauterbach, and Peter Jesse, Schramberg, all of Fed. Rep. of Germany, assignors to Gebruder Junghans GmbH, Schramberg, Fed. Rep. of Germany**

**Filed Aug. 22, 1979, Ser. No. 68,620**

**Claims priority, application Fed. Rep. of Germany, Sep. 12, 1978, 7827031**

**Int. Cl.³ H05K *7/14***

**U.S. Cl. 361—399** **5 Claims**



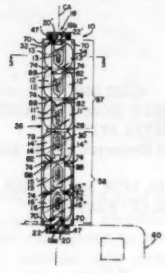
1. A contact arrangement in a battery-powered instrument of the type comprising a housing made of synthetic material and including at least one wall, a circuit board disposed within said housing parallel to said wall, electric light bulb means including a screw threaded socket secured within said housing, and a recess within said housing for receiving a battery, said contact arrangement comprising a bus portion fastened to said housing, said bus portion having at one end a first leg with means for making contact with a terminal of a battery to be seated in said recess, said bus portion having at another end a second leg having a knife contact in contact with a circuit path on said circuit board, said bus portion including a third leg contacting said threaded bulb socket under spring action to establish electrical connection therewith.

4,303,963

## MULTILAMP PHOTOFLASH UNIT WITH PROTECTION AGAINST ELECTROSTATIC CHARGES

Emery G. Audesse, Beverly, Mass.; Donald W. Hartman, and John W. Shaffer, both of Williamsport, Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Oct. 15, 1979, Ser. No. 85,167
Int. Cl.[3] G03B 15/02
U.S. Cl. 362—15 8 Claims



1. A multilamp photoflash unit comprising, in combination, a circuit board having lamp firing circuitry on a surface thereof, an array of electrically ignitable flashlamps disposed on said circuit board, each of said flashlamps having a pair of lead-in wires connected to said circuitry, said circuitry including a common circuit conductor run connected electrically to one lead-in wire of said lamps, a housing member having a channel within which said circuit board is located and having reflective surfaces adjacent to said flashlamps, a continuous coating of electrically conductive reflective material covering the interior walls of said channel for providing said reflective surfaces, means electrically connecting said reflective surfaces to said common circuit conductor run, and one or more openings through the wall of said housing channel, said continuous conductive coating extending through each of said openings to the exterior surface of said housing member, whereby electrostatic protection is provided by extending electrical ground to the exterior of the unit.

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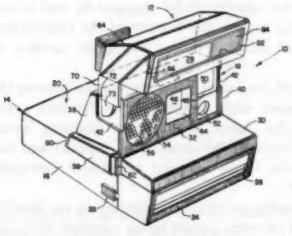
4,303,964

## TAMPER RESISTANT SNAP-FIT STROBE HOUSING

Robert A. Goodwin, Braintree, and David V. Allen, Malden, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 1, 1979, Ser. No. 80,947
Int. Cl.[3] G03B 15/02
U.S. Cl. 362—16 3 Claims



1. In a housing for retaining electronic elements of a photographic flash unit, said housing comprising mating first and second housing sections held in an assembled condition by complementary structure for latching said first section to said second, said complementary structure comprising a first latching arrangement carried on the interior of an exterior wall of said first section, and a second latching arrangement, crried by said second section in position to engage said first latching arrangement when said components are mated to thereby prohibit separation of the housing sections when the housing sections are pulled in opposite directions in a given plane generally parallel to the plane of said exterior wall, the improvement wherein:

said first latching arrangement includes a member extending from the interior of said wall with a portion of the member in overlapping relationship and interiorly of said second latching arrangement, and said second latching arrangement being adapted to engage said overlapping portion in a latching arrangement whereby said second latching arrangement is retained in continuous engagement with said overlapping portion when said wall is pulled in opposite directions relative to the first latching arrangement at an angle to the given plane.

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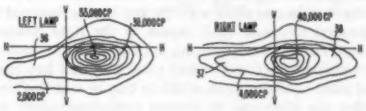
4,303,965

## SINGLE-MODE VEHICULAR HEADLAMP SYSTEM

Robert L. Vile, Glen Ridge, and Elam Pitkjaan, Cedar Grove, both of N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 951,825, Oct. 16, 1978. This application Mar. 6, 1980, Ser. No. 127,616
Int. Cl.[3] B60Q 1/00; F21M 3/12
U.S. Cl. 362—61 17 Claims




1. A roadway lighting system for a motor vehicle comprising, in combination;

a single pair of headlamps mounted on the front of the vehicle and on opposite sides of its centerline so that one of said headlamps constitutes a left headlamp and the remaining headlamp a right headlamp, relative to the position of the operator of the vehicle,

a single light source within each of said headlamps, and

means for energizing said headlamps including a switch for operating and de-activating the light sources in unison and thereby providing a single mode of roadway illumination that is used for all driving conditions,

each of said headlamps having a reflector component and a lens component that define a housing and direct the light rays generated by the associated light sources into a light beam of controlled intensity and configuration,

said lens components having different light-modifying characteristics that are adapted to provide different beam patterns which complement one another,

(a) the left headlamp having a lens component such that the left headlamp produces a beam pattern which has a sharp horizontal cut-off, a concentrated region of maximum light intensity that is located substantially below the horizontal axis and to the right of the vertical axis, and additional regions of light that surround the maximum light intensity region and together therewith provides long range illumination of the roadway in front of the vehicle,

(b) the right headlamp having a lens component such that the right headlamp produces a beam pattern which includes a concentrated region of maximum light intensity that is also located substantially below the horizontal axis and to the right of the vertical axis and merges with additional surrounding regions of light that extend laterally and thereby provide short range illumination of the roadway as well as fill-in illumination for the center of the driving lane between the two maximum-intensity light

regions, the beam intensity of the right headlamp being less than that of the left headlamp.

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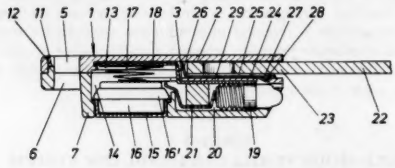
**4,303,966**

## LIGHT CONNECTABLE WITH A KEY

**Heinz Wolter, Meiswinkel 3, 5067 Kürten, Fed. Rep. of Germany**

**Filed Jun. 22, 1979, Ser. No. 51,293**
**Claims priority, application Fed. Rep. of Germany, Jun. 23, 1978, 2827560**
**Int. Cl.³ F21V *33/00***
**U.S. Cl. 362—116** **10 Claims**




1. A light operating with an incandescent bulb and a battery and adapted to hold a key with a key handle, comprising

a light housing being formed with means for cooperatively receiving the incandescent bulb and the battery,

a plate,

a wide surface of the key handle being fastened planarly on said plate,

said light housing being formed with shaft means for receiving therein said plate with the key handle fastened thereon pushed into said shaft means of the light housing, said shaft means has an opening thickness corresponding to the combined thickness of said plate plus said key handle,

said plate conforming in width to that of said shaft means so that the plate can be pushed complementarily in width into the shaft means,

means for interlocking said plate with the housing in the pushed-in position,

said interlocking means comprises,

said light housing having a wall formed with an opening, and

said plate formed with at least one projection means for the interlocking of said plate with the housing, said projection means snaps resiliently into said opening of said wall of said light housing in the pushed-in position.

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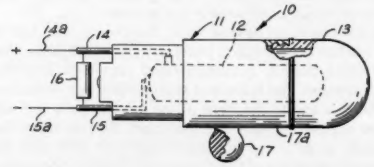
**4,303,967**

## WELDING LIGHT

**David M. Letsche, Rte. 3, Box 362, Proctorville, Ohio 45669, assignor to David M. Letsche, Proctorville, Ohio**

**Filed Mar. 21, 1980, Ser. No. 131,947**
**Int. Cl.³ F21V *33/00*; B23K *9/28***
**U.S. Cl. 362—119** **2 Claims**




1. A welding light assembly, comprising, in combination, a welding rod holder and welding light mounted thereupon, for illuminating an area of a weld at the front end of said holder, a high voltage bulb, a sleeve enclosing a larger rear portion of said bulb, while a smaller forward portion of said bulb protrudes outwardly into a translucent cover on said sleeve front end, a recess inside said cover receiving and enclosing a said bulb forward portion, a pair of rearwardly extending prongs from a rear of said sleeve electrically being connected to said bulb, a resistor connected between said prongs, a spherical ball fixedly secured to an outer side of said sleeve, a socket member in which said ball is swiveled, a flange included on said socket member, and holes through said flange receiving screw fasteners secured on said welding rod holder.

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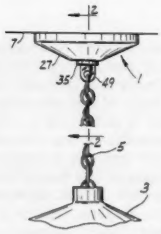
**4,303,968**

## MOUNTING ASSEMBLY FOR A CHANDELIER-TYPE LIGHT FIXTURE

**Charles D. Goralnik, 200 Brynwyck Pl., St. Louis County, Mo. 63141**

**Filed Dec. 13, 1979, Ser. No. 103,239**
**Int. Cl.³ F21S *1/02***
**U.S. Cl. 362—147** **15 Claims**




1. A mounting assembly for a chandelier-type light fixture to be suspended by suspending means such as a chain or the like from a ceiling, said assembly comprising:

an outlet box open at its bottom adapted to be mounted in an opening in the ceiling;

a crossbar extending beneath the bottom of the outlet box, the ends of the crossbar projecting beyond the sides of the outlet box for engagement with the ceiling;

means interconnecting the crossbar and the outlet box, said interconnecting means being adjustable for varying the elevation of the crossbar relative to the outlet box and capable of developing a clamping force for holding the crossbar clamped against the ceiling in spaced relation to the outlet box;

a support extending down from the crossbar having a head at its lower end adapted to be engaged by and to support the suspending means, the bottom of the head being at a predetermined distance below the upper surface of the crossbar;

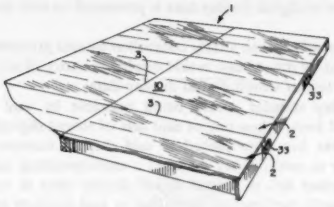
a canopy beneath the outlet box covering the bottom thereof having an upper edge toward the outlet box, a bottom away from the outlet box and an opening extending through the bottom, the head of the support and the suspending means being adapted to extend through said opening; and

means for releasably securing the canopy to the head of the support, said securing means being adapted to be carried on the head of the support and engageable with the bottom of the canopy, the height of the canopy constituted by the distance between the upper edge of the canopy and its bottom being less than said predetermined distance so that, with the canopy secured to the head of the support, the upper edge of the canopy engages the ceiling.

## 4,303,969
## PORTABLE DANCE FLOOR SYSTEM

Jerrol D. Hamilton, 5310 W. 21st Ave., Gary, Ind. 46404, and Booker T. Hamilton, Jr., 540 Buchanan St., Gary, Ind. 46407

Filed May 12, 1980, Ser. No. 148,762
Int. Cl.³ F21S 1/02
U.S. Cl. 362—153 10 Claims



1. A portable modular dance floor system comprising

a plurality of modular units adapted to be interconnected in a side by side relationship to form a continuous upper surface, said modular units having translucent panels forming said upper surface,

coupling means attached to each of said plurality of modular units to interconnect said plurality of modular units,

said coupling means of one of said modular units being adapted connected to the coupling means of an adjacent modular units,

electrical circuit means operatively positioned in each of said plurality of modular units,

said coupling means are adapted to create an electrical circuit between adjacent modular units upon the connection of one of said coupling means to the coupling means of an adjacent modular unit,

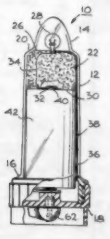
illumination means coupled to said electrical circuit means, and

said illumination means being positioned beneath said translucent panels forming said continuous surface to provide an illuminating effect thereon.

## 4,303,970
## BATTERY POWERED LAMP

James H. Robertson, 6502 Agnes Ave., North Hollywood, Calif. 91606

Filed Jun. 9, 1980, Ser. No. 157,419
Int. Cl.³ F21L 7/00
U.S. Cl. 362—203 20 Claims



1. An improved socketless battery powered electrical lamp, said lamp comprising, in combination:

a. a hollow housing having a transparent front end;

b. a socketless light bulb;

c. a flexible resilient electrically insulative biasing block releasably supporting said light bulb in said transparent end;

d. a battery in said housing behind said block;

e. an end cap releasably secured to the rear end of said housing;

f. a rotary switch extending through said rear end cap;

g. first electrical contact means disposed on the rear end of said block;

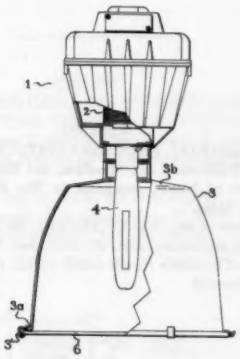
h. second electrical contact means disposed in said housing in the path of said switch; and

i. separate leads from said lamp bulb to said first and second contact means, whereby said switch can be rotated to complete an electrical circuit between opposite poles of said battery and said light bulb to power said light bulb.

## 4,303,971
## LUMINAIRE

Marcus P. Hogue, Hendersonville, and Gregory A. Frisbee, East Flat Rock, both of N.C., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 29, 1979, Ser. No. 88,951
Int. Cl.³ F21V 7/00
U.S. Cl. 362—297 12 Claims



1. A luminaire comprising, in combination, a generally dome-shaped reflector having a wall extending about an axis and defining a bottom opening, and a lamp mounted in said reflector extending substantially along said axis, said reflector adapted to be mounted with said axis vertical above a warehouse aisle or the like for illuminating stacked material along both sides of the aisle, said reflector wall comprising four reflector portions arranged about said axis for directing light from said lamp downwardly and outwardly through said bottom opening in four light beams respectively distributed in four quadrants about the luminaire for illuminating four different areas of the stacked material on opposite sides of the warehouse aisle.

## 4,303,972
## CONTROLLING THE CIRCULATING CURRENT IN NATURALLY COMMUTATED STATIC POWER CONVERTERS

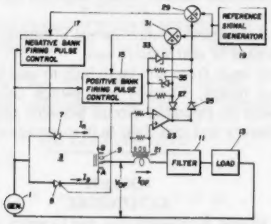
Eric J. Stacey, Penn Hills, Pa.; Donal E. Baker, American Twp., Allen County, Ohio; Charles L. Doughman, and Ralph D. Jessee, both of Shawnee Township, Allen Co., Ohio, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 19, 1979, Ser. No. 95,820
Int. Cl.³ H02P 13/30
U.S. Cl. 363—10 11 Claims

1. A method of synthesizing an output waveform from a multiphase AC voltage source comprising the steps of:

generating firing pulses to sequentially fire a plurality of thyristors arranged in positive and negative banks in a naturally commutated power circuit inserted between the AC voltage source and a load;

determining which bank of thyristors is carrying the load current; and




retarding the firing pulses to the nonload current carrying bank independently of the timing of the firing pulses to the other bank to reduce the circulating current in the thyristor banks.

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**4,303,973**

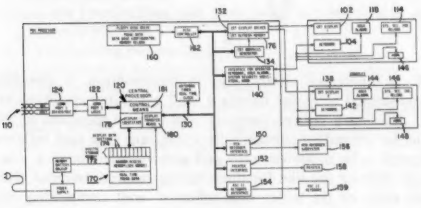
## INDUSTRIAL PROCESS CONTROL SYSTEM

**Robert A. Williamson, Jr., Medfield, and Roger W. Ford, Walpole, both of Mass., assignors to The Foxboro Company, Foxboro, Mass.**

**Continuation of Ser. No. 737,195, Oct. 29, 1976, abandoned. This application Jun. 22, 1979, Ser. No. 51,225**

**Int. Cl.[3] G06F *15/46*; G05B *19/02*; G06F *3/14***

**U.S. Cl. 364—103** **52 Claims**



**1.** In an industrial process control system for use with complex processes having a large number of conditions the values of which are to be measured and the measurements directed to associated means for developing corresponding process control signals for elements such as valves and the like, each combination of means for measuring a condition and for developing a corresponding control signal defining a process control loop; said loops being organized in groups pertaining to respective process tasks; and said groups being clustered as distinct areas of the overall plant;

display apparatus comprising:

an operator's console including a display device and a data-entry keyboard;

a display memory for said display device containing digital data for continuously controlling the display;

a digital storage memory comprising a plurality of storage sections each with a set of digital display data defining a corresponding complete display for said display device and arranged to be selectively transferred to said display memory to control the display;

a first set of said digital display data serving to present in separate display sectors of said display device summary information concerning respective process areas;

said digital storage memory having further sets of digital display data including sets representing detailed information concerning a corresponding area summarized in a respective one of said sectors of the display produced by the digital data from said first set of said digital data;

said sets of digital display data each also including display data for presenting symbols on said device in predetermined locations to identify the functions of preselected variable-function keys of said keyboard when the complete set of digital display data is presented on said device; and

display transfer means jointly controlled by said pre-selected keys and by the storage in said display memory of any one of said sets of stored digital display data;

said display transfer means being operable by said preselected keys, when one of said sets of stored digital display data has been placed in said display memory, to transfer to said display memory a corresponding one of said further sets of stored digital display data in accordance with the function identified by said symbols of the set of display data presented on the display device by said one set of display data.

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**4,303,974**

**Patent Not Issued For This Number**

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**4,303,975**

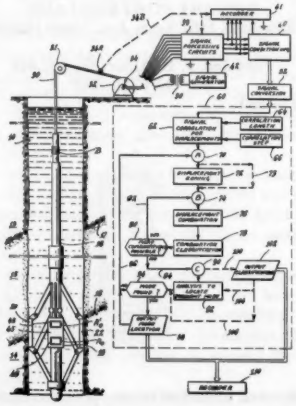
## DIPMETER DISPLACEMENT QUALIFYING TECHNIQUE

**Vincent R. Hepp, Ridgefield, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.**

**Continuation of Ser. No. 537,310, Dec. 30, 1974, abandoned. This application Nov. 15, 1979, Ser. No. 94,595**

**Int. Cl.[3] G06F *15/20***

**U.S. Cl. 364—422** **20 Claims**



**1.** A method for determining the attitudes of earth formation features in the vicinity of a borehole comprising the steps of:

(a) passing a plurality of at least four transducers through a borehole to obtain a plurality of depthvarying signals, each of said transducers being urged in the direction of the borehole wall to achieve transducerwall contact;

(b) detecting which, if any, of said transducers fail to achieve transducer-wall contact; and

(c) combining said plurality of depth-varying signals, less the signal from any transducer failing to achieve transducer-wall contact, to generate improved, less error prone, tangible representations of the attitudes of said earth formation features.

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4,303,976

## FUEL CONTROL FOR A MULTI-ENGINE GAS TURBINE INSTALLATION

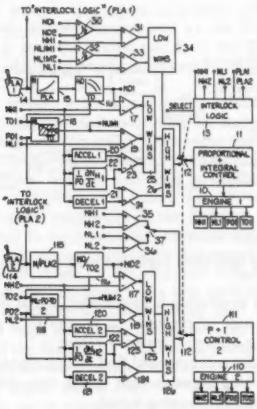
**Michael J. Joby, West Midlands, England, assignor to Lucas Industries, Ltd., Birmingham, England**

**Filed Sep. 11, 1979, Ser. No. 74,533**

**Claims priority, application United Kingdom, Sep. 15, 1978, 36972/78**

**Int. Cl.³ F02C 9/26; G05B 11/42**

**U.S. Cl. 364—431** **1 Claim**




1. An electronic fuel control for a multi-engine gas turbine installation comprising at least two independent channels for controlling respective first and second engines, each channel including a speed demand signal generating means for providing a first signal representation of desired speed and first error signal generating means for generating a first error signal dependent on the error between the first signal and an actual speed signal corresponding to the actual speed of the engine controlled by said each channel; common means connected to receive said first signal of each channel for providing an output of magnitude corresponding to the average of the first signals; second error signal generating means for generating a second error signal dependent on the error between the output of said common means and said actual speed signal in respect of a specific one of the engines; third error signal generating means provided for engine controlled by the other of said channels for generating a third error signal corresponding to the difference between the actual speed signals in respect of said first and second engines; a fuel control means for each engine, each adapted to control fuel flow to the associated engine in accordance with an error signal fed thereto and error signal selector means having two conditions and adapted in one condition to feed the first error signal from the first error signal generating means to the respective fuel control means and in its other condition to feed the second error signal to the fuel control means associated with said one specific engine and said third error signal to the fuel control means associated with each other engine.

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4,303,977

## METHOD FOR CONTROLLING IGNITION ENERGY IN AN INTERNAL COMBUSTION ENGINE

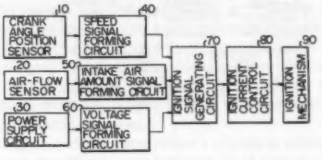
**Mamoru Kobashi, and Toshihisa Ogawa, both of Aichi, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Oct. 12, 1979, Ser. No. 84,081**

**Claims priority, application Japan, Oct. 17, 1978, 53-126862**

**Int. Cl.³ F02P 9/00; G06F 15/20**

**U.S. Cl. 364—431** **5 Claims**




1. A method for controlling ignition energy in a rotating internal combustion engine, the internal combustion engine being of the type having at least one ignition coil, the ignition coil having a primary winding, the method comprising the steps of:

generating a first signal containing information which is responsive to the rate of rotation of the internal combustion engine, said first signal information being periodic with respect to the rotation of the internal combustion engine;

generating a second signal containing information responsive to the magnitude of a supply voltage which is applied to the primary winding of the ignition coil;

generating a third signal containing information which is responsive to a rate at which air is drawn into the internal combustion engine;

generating a fourth signal containing information which corresponds to an engine firing time, said fourth signal being produced in response to a calculation concerning said information contained in said first and third signals;

generating a fifth signal containing information which corresponds to a period of time during which current flows in the primary winding of the ignition coil, said fifth signal being produced in response to a calculation concerning said information contained in said first and second signals;

generating a sixth signal containing information which corresponds to a time of initiating current flow in the primary winding of the ignition coil, said sixth signal being generated in response to a calculation concerning said information contained in said fourth and fifth signals; and

supplying a current to the primary winding of the ignition coil during an interval of time beginning at said time of initiating current flow to a time corresponding to said engine firing time.

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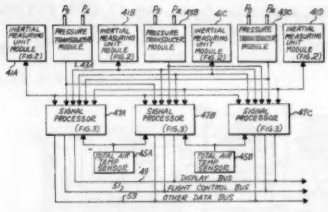
**4,303,978**

## INTEGRATED-STRAPDOWN-AIR-DATA SENSOR SYSTEM

**Jack C. Shaw, Kirkland; John F. Gilbert, Des Moines; Guy R. Olbrechts, and Melville D. McIntyre, both of Bellevue, all of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Apr. 18, 1980, Ser. No. 142,135**
**Int. Cl.[3] G06F *15/50*; G05D *1/00***
**U.S. Cl. 364—453** **62 Claims**




**1**. An integrated-strapdown-air-data sensor system for an aircraft comprising:

(a) a plurality of inertial measuring unit (IMU) modules, suitable for strapdown mounting in an aircraft, each of said IMU modules acceleration of said aircraft along at least two different axes and producing raw angular rate and raw linear acceleration signals related thereto, each of said IMU modules including a temperature sensor for sensing the temperature of the related IMU module and producing an IMU temperature signal related thereto;

(b) at least one pressure transducer module, suitable for mounting in an aircraft, for sensing air data and producing raw air data signals related thereto;

(c) at least one total air temperature sensor, suitable for mounting in an aircraft, for sensing the outside total air temperature at the skin of the aircraft and producing a total air temperature signal related thereto; and,

(d) at least one signal processor coupled to said plurality of IMU modules, said at least one pressure transducer module and said at least one total air temperature sensor, for:

(1) receiving said raw angular rate, raw linear acceleration, IMU temperature, raw air data and total air temperature signals;

(2) converting said raw angular rate, raw linear acceleration, IMU temperature, raw air data, and total air temperature signals into common time base digital form;

(3) compensating said raw angular rate and raw linear acceleration signals in common time base digital form for various types of errors that cause said raw angular rate and raw linear acceleration signals to be inaccurate and producing accurate body angular rate and accurate body linear acceleration signals;

(4) calibrating said raw air data signals in common time base digital form to produce accurate air data signals; and,

(5) combining said accurate body angular rate and accurate body acceleration signals, and said accurate air data signals, to produce accurate attitude, navigational position and velocity signals that define the attitude, navigational position and velocity of said aircraft and are suitable for use by the automatic flight control, navigation and display systems of said aircraft.

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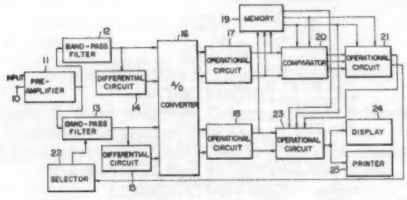
**4,303,979**

## FREQUENCY SPECTRUM VARIATION MONITORING SYSTEM

**Kanji Kato, and Satoshi Tanisaka, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 17, 1978, Ser. No. 897,141**
**Claims priority, application Japan, Apr. 18, 1977, 52-43565**
**Int. Cl.[3] G06F *15/31***
**U.S. Cl. 364—485** **7 Claims**




**1**. A frequency spectrum variation monitoring system comprising:

first means for producing a first analog signal in a specific frequency range in response to receipt of a plant input signal having a given frequency range;

second means for receivng said first analog signal to deliver a second analog signal which is the time-differentiated version of said first analog signal;

third means for converting said first and second analog signals into first and second digital signals respectively;

fourth means for calculating the root mean square value and average frequency of said first analog signal on the basis of said first and second digital signals;

fifth means for storing the calculated results of said fourth means;

sixth means for calculating the differences between each of the root mean square value and average frequency previously stored in said fifth means and each of the instantaneous root means square value and average frequency calculated by said fourth means so as to calculate the root mean square value and average frequency of an anomalous peak component in said plant input signal on the basis of the output signals produced by said fourth and fifth means when said differences exceed predetermined values; and

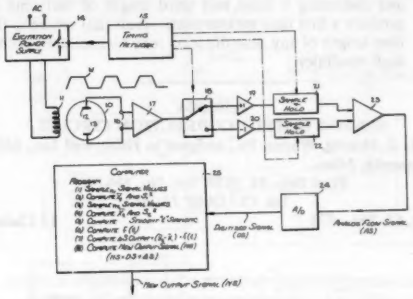
seventh means for indicating the calculated results of siad sixth means.

4,303,980

## ELECTROMAGNETIC FLOWMETER SYSTEM HAVING AUTOMATICALLY ADJUSTED RESPONSE CHARACTERISTICS

John S. Yard, Doylestown, Pa., assignor to Fischer & Porter Company, Warminster, Pa.

Filed Dec. 3, 1979, Ser. No. 99,736
Int. Cl.[3] G01F *1/60;* G06F *15/20*
U.S. Cl. 364—510 9 Claims



1. An electromagnetic flowmeter system having an automatically-adjusted response time comprising:

A. a flow tube through which a fluid to be metered is conducted, said tube being provided with a pair of diametrically-opposed electrodes;

B. an electromagnet excited by a low-frequency pulsatory current wave having alternate levels to produce a field in said tube which is intercepted by the fluid to induce a signal in said electrodes, said field being in a first state during one level and in a second state during the other level;

C. means to sample the signal during each first and second state of the field and to develop an analog output signal depending on successive differences therebetween, said analog output signal having a random noise content;

D. a statistical analyzer including an analog-to-digital converter to digitize said analog output signal and a microcomputer responsive to the digitized signal and programmed to determine the statistical significance of the difference between two arithmetic means, a first series of successive values of the digitized signal being used to establish the first mean and a first variance, and a second series of successive values being used to establish the second mean and a second variance, the computer on the basis of the Student "t" statistic calculating the difference between the two arithmetic means to produce a digital output signal whose response time is a function of the random noise content, thereby minimizing the adverse effects of noise on the system.

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4,303,981

## DISTANCE MEASURING ARRANGEMENT

Takashi Kondo, Izumi, and Nobuo Hashimoto, Ashiya, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Azuchi, Japan

Filed Sep. 19, 1979, Ser. No. 76,954
Claims priority, application Japan, Sep. 19, 1978, 53-115255
Int. Cl.[3] G03B *7/08*
U.S. Cl. 364—525 6 Claims

4. In a distance measuring arrangement which includes:

first photoresponsive means adapted to detect illuminance intensity of a target area which is located in a given direction in front of said first photoresponsive means;

second photoresponsive means laterally spaces from said first photoresponsive means;

optical scanning means movable for scanning a scene including said target area at a given speed so as to cause said second photoresponsive means to detect the illuminance intensity of the aimed area of said scene being scanned by said scanning means, the output of said second photoresponsive means being coincident with that of said first photoresponsive means when said scanning means is moved to a scanning position to cause said second photoresponsive means to detect the illuminance intensity of said target area being detected by said first photoresponsive means;

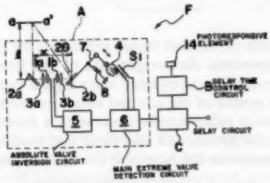
means for generating a reference signal upon passing of said scanning means through a given initial scanning position; and

means for generating a distance signal by detecting the coincidence of said both outputs of said first and second photoresponsive means, the period of time from the generation of said reference signal till that of said distance signal corresponding to the distance to said target area;

an improvement comprising:

means for detecting the average illuminance intensity of said target area; and

means for generating a corrected distance signal under the control of said illuminance intensity detecting means such that said corrected distance signal is generated later than said distance signal by a period of time corresponding to the average illuminance intensity of said target area;



wherein said corrected signal generating means includes a delay circuit which starts operating in response to said distance signal to generate said corrected distance signal after a lapse of a delay time from the generation of said distance signal and further includes a delay time control circuit which controls the length of the delay time in accordance with the output of said average illuminance intensity detecting means;

and wherein said delay time control circuit is arranged so that, when the illuminance intensity E of said target area is higher than a threshold illuminance intensity $E_2$ at which a delay in response takes place in said first and second photoresponsive means, the length of the delay time is equal to a delay time period $\Delta T_1$ of said first and second photoresponsive means with respect to a given minimum illuminance intensity $E_1$ and is further arranged so that, when the illuminance intensity E of said target area is between said illuminance intensities $E_1$ and $E_2$, the length of the delay time is equal to such a period of time obtained by subtracting a delay time period $\Delta T(E)$ of said first and second photoresponsive means with respect to the prevailing average illuminance intensity of said target area from said delay time period $\Delta T_1$ of said first and second photoresponsive means with respect to said minimum illuminance intensity $E_1$.

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4,303,982

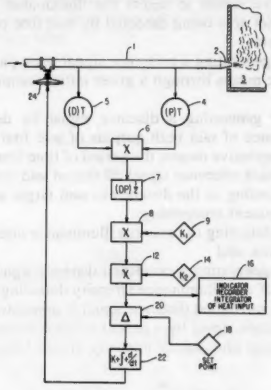
## SYSTEM FOR THE MEASUREMENT AND CONTROL OF THE HEAT INPUT TO A GAS BURNER

Azmi Kaya, Akron; Marion A. Keyes, IV, Chagrin Falls, and Michael P. Lukas, Eastlake, all of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Aug. 9, 1979, Ser. No. 65,020
Int. Cl.[3] G01K *17/06*
U.S. Cl. 364—550 4 Claims

1. In a system for the measurement of the rate of BTU input

to a gas burner discharging into a furnace at atmospheric pressure, comprising, means generating a first signal proportional to burner inlet gauge pressure, means generating a second signal proportional to the in-situ density of the gas at the burner inlet and means responsive to the first and second signals generating a third signal proportional to the square root of




the product of the first signal multiplied by the second signal which represents the weight rate of gas flow to the burner, means generating a constant value signal proportional to the BTU per pound of the gas and means responsive to said third and constant value signals generating a fourth signal proportional to the product of said third and constant value signals which represents the rate of BTU input to the burner.

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**4,303,983**

## METHOD AND APPARATUS FOR MEASURING TIME

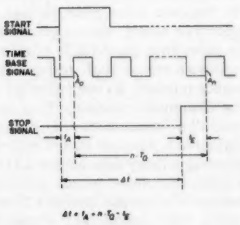
**Hoiko Chaborski, Munich, Fed. Rep. of Germany, assignor to MITEC-Moderne Industrietechnik GmbH, Ottobrunn, Fed. Rep. of Germany**

**Filed Sep. 24, 1979, Ser. No. 78,250**

**Claims priority, application Fed. Rep. of Germany, Sep. 29, 1978, 2842450**

**Int. Cl.³ G04F 7/06**

**U.S. Cl. 364—569** **17 Claims**




1. A method for measuring the time between a first occurring start impulse signal and a subsequently occurring stop impulse signal, comprising the following steps:

(a) generating in a signal processing circuit arrangement a constant frequency time base signal having a fixed period ($T_Q$);

(b) supplying said start impulse signal to start channel means of said signal processing circuit arrangement for beginning a counting of time base signal periods after a measurable first length of real time ($t_A$) following the occurrence of said start impulse signal;

(c) supplying said stop impulse signal to stop channel means of said signal processing circuit arrangement for stopping the counting after a measurable second length of real time ($t_E$) following the occurrence of the stop impulse signal, whereby the counting of the time base signal periods constitutes a measuring of a third length of real time ($n \cdot T_Q$) wherein n is the number of counted leading edges of said time base signal having said period ($T_Q$);

(d) measuring said first measurable length of real time ($t_A$) and adding it to said third length of real time, and

(e) measuring said second measurable length of real time ($t_E$) and deducting it from said third length of real time to produce a first time measurement result ($\Delta t$) whereby the time length of any time duration may be measured with a high resolution.

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**4,303,984**

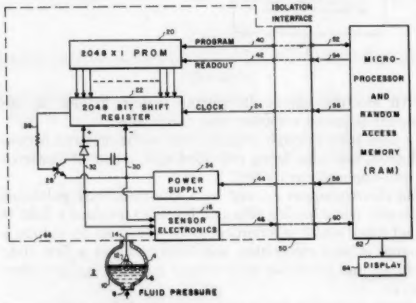
## SENSOR OUTPUT CORRECTION CIRCUIT

**Felix J. Houvig, Wayne, Pa., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Dec. 14, 1979, Ser. No. 104,590**

**Int. Cl.³ G06F 15/20**

**U.S. Cl. 364—571** **12 Claims**




1. A sensor correction circuit comprising:

a process variable sensor means,

a programmable read-only memory for storing a predetermined number of digital data bits in respective data storage cells,

a shift register having a plurality of digital bit storage stages at least equal in number to the number of data bits stored in said memory, an output terminal, and a clock signal input terminal,

first circuit means for connecting each of said storage cells to a respective one of said storage stages,

clock signal means for connecting said clock signal input terminal to a source of clock signals,

output means,

second circuit means for connecting said output terminal to said output means, and

housing means for enclosing said sensor means, said memory, said register, said clock signal means and said first and second circuit means while allowing access to said clock signal means, said output means and said sensor means.

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**4,303,985**

## ANALOG VOLTAGE TO PULSE RATE OR ANALOG TO FREQUENCY CONVERTER

**Max A. Schaffer, Thousand Oaks, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.**

**Filed Dec. 6, 1979, Ser. No. 101,043**

**Int. Cl.³ H03L 7/00; H03K 3/72**

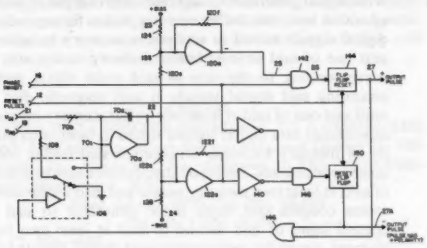
**U.S. Cl. 364—701** **7 Claims**

1. Apparatus for producing pulses having a predetermined charge content comprising:

a first summing amplifier having a plurality of input terminals and including scaling resistors, an operational amplifier, and feedback resistor, for receiving signals to be algebraically summed;

apparatus for applying signals from said input terminals to the operational amplifier of said summing amplifier to produce output pulses;

a first current integrating apparatus having first and second input terminals and including scaling resistors, an operational amplifier and feedback capacitor, said first input terminal being connected to receive the output pulses from said first summing amplifier;



a source of precision voltage connected to said second input terminal of said integrating apparatus and to a first input terminal of said first summing amplifier;

the output of said integrating apparatus being connected through a first polarity inverter to a second said input terminal of said first summing amplifier to control the amplitude of the algebraic sum of the charge under positive and negative pulses of the output of said first summing amplifier to be equal to the time integral of said precision voltage.

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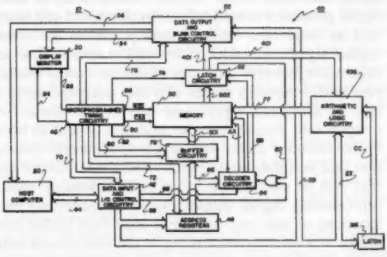
**4,303,986**

## DATA PROCESSING SYSTEM AND APPARATUS FOR COLOR GRAPHICS DISPLAY

**Hakan Lans, Oviksgaten 43, 162 21 Vallingby, Stockholm, Sweden**

**Filed Jan. 9, 1979, Ser. No. 2,017**
**Int. Cl.[3] G06F *3/14***
**U.S. Cl. 364—900** **30 Claims**



1. A data processing system comprising:

host computer means for outputting binary coded color data signals;

memory means for selectively storing said binary coded color data signals including means for selectively outputting said binary coded color data signals in multiple words at a rate of outputting inversely proportional to the multiple as referenced the rate of storing;

controller means for selectively outputting display signals at a rate of output proportional to said multiple as referenced to the memory means rate of outputting, responsive to said multiple words of binary coded color data; and

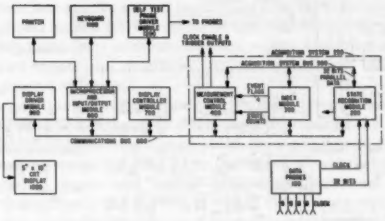
display means for selectively providing a visual display responsive to said display signals.

**4,303,987**

## LOGIC STATE ANALYZER WITH GRAPHIC DISPLAY

**George A. Haag, Colorado Springs; O. Douglas Fogg, Loveland; Gordon A. Greenley; Steve A. Shepard, both of Colorado Springs, all of Colo., and F. Duncan Terry, Meridan, Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Division of Ser. No. 828,138, Aug. 29, 1977, abandoned. This application May 22, 1979, Ser. No. 41,363**
**Int. Cl.[3] G06F *3/153, 3/05***
**U.S. Cl. 364—900** **6 Claims**



1. Apparatus for selecting and storing a sequence of logic state values occurring in a collection of digital signals and for graphing the stored logical values of an ordered set of digital signals selected from among the collection thereof, the apparatus comprising:

control means for designating from among the collection of digital signals an ordered set thereof defining a value that varies in accordance with the logical values of the members of the ordered set, and for designating a trigger condition;

input means coupled to receive the collection of digital signals, for performing signal conditioning thereon according to preselected thresholds and polarities to produce a collection of conditioned signals that includes an ordered set of conditioned signals representing the ordered set of digital signals designated with the control means;

trigger means coupled to the collection of conditioned signals and to the control means, for producing a trigger signal upon the occurrence of the designated trigger condition;

storage means including an ordered series of locations, the storage means coupled to the trigger signal and to the ordered set of conditioned signals, for storing in an initial location of the ordered series of locations the value possessed by the ordered set of conditioned signals upon the occurrence of the trigger signal, and for storing into consecutive locations of a remaining portion of the ordered series of locations values assumed by the ordered set of conditioned signals subsequent to the occurrence of the trigger signal; and

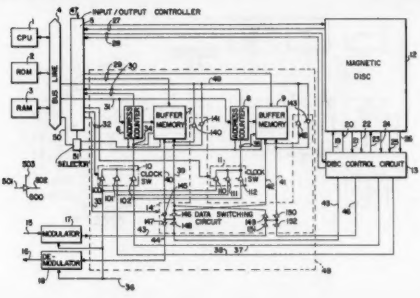
graphic display means coupled to the storage means and to the control means, for displaying with cartesian coordinates a graph of the values of the ordered set of conditioned signals stored in the storage means, one axis of the cartesian coordinates representing the range of possible assumable values for the ordered set, and the other axis representing the ordered series of locations in the storage means.

4,303,988

# RANDOM ACCESSIBLE SIGNAL FILING SYSTEM

Eiichi Tsuboka, 4-9-83 Miigaoka, Neyagawa-shi, Osaka-fu; Fumio Maehara, 2-15, Satanakamachi, Moriguchi-shi, Osaka-fu; Hiroshi Fujita, 3-14, Miyukihigashimachi, Neyagawa-shi, Osaka-fu, all of Japan; Yoshiteru Izura, deceased, Late of Osaka, Japan, and by Keiko Izura, heir, 3-14-11, Shinsenrikitamachi, Toyonaka-shi, Osaka-fu, Japan

Continuation-in-part of Ser. No. 805,224, Jun. 9, 1977, abandoned. This application Jun. 5, 1979, Ser. No. 45,676
Claims priority, application Japan, Jun. 16, 1976, 51-71506
Int. Cl.[3] G11B 5/09
U.S. Cl. 364—900 5 Claims




1. A random access digital singal recording and reproducing system comprising:

a sampling pulse signal generator for generating a sampling pulse signal;

a modulator coupled to said sampling pulse generator for receiving externally produced analog signals and converting said analog signals into digital signals in accordance with said sampling pulse signal;

a demodulator coupled to said sampling pulse generator for receiving digital signals and converting said digital signals into analog signals in accordance with said sampling pulse signal;

a magnetic disc unit for recording, storing and reproducing digital signals;

a magnetic disc control means coupled to said magnetic disc unit and comprising a write signal generator for producing a write signal and a read signal generator for producing a read signal, said magnetic disc control means causing said magnetic disc unit to record said digital signals at a rate corresponding to the rate of said write signal and to reproduce said digital signals at a rate corresponding to the rate of said read signal;

at least two buffer memory means, comprising random access memories having a plurality of memory locations and a rate control input, for recording digital signals and for reproducing digital signals at a rate corresponding to the rate of the signal applied to said rate control input;

a buffer control means coupled to said sampling pulse signal generator, said modulator, said demodulator, said magnetic disc control means and said at least two buffer memory means, said buffer control means operating in two manually selectable modes, wherein when said first mode is selected, said buffer control means couples said modulator to one of said at least two buffer memory means and couples said sampling pulse signal generator to said rate control input of said one of said at least one buffer memory means for recording said digital signals produced by said modulator in successive memory locations of said one of said at least two buffer memory means at a rate corresponding to the rate of said sampling pulse signal until said one of said at least two buffer memory means has recorded digital signals at each of its plurality of memory locations whereupon said buffer control means couples said modulator to a second of said at least two buffer memory means and said buffer control means couples said sampling pulse generator to said rate control input of said second of said at least two buffer memory means for storing said digital signals produced by said modulator in successive memory locations of said second of said at least two buffer memory means at a rate corresponding to the rate of said sample pulse signal, said buffer control means couples said magnetic disc control means to said one of said at least two memory means and said buffer control means couples said write signal generator to said rate control input of said one of said at least two buffer memory means for reproducing digital signals stored in successive memory locations of said one of said at least buffer memory means at a rate corresponding to the rate of said write signal and for recording said digital signals in said magnetic disc unit until said one of said at least two buffer memory means has reproduced said digital signals stored in each of its plurality of memory locations whereupon said buffer control means couples said magnetic disc control unit to a second of said at least two memory means and said buffer control means couples said write signal generator to said rate control input of said second of said at least two buffer memory means for reproducing said digital signals stored in successive memory locations of said second of said at least two buffer memory means at a rate corresponding to the rate of said write control signal and for recording said digital signals in said magnetic disc unit, whereby each of said at least two buffer memory means in turn records digital signals produced by said modulator and reproduces said recorded digital signals for recording in said magnetic disc unit; and wherein when said second mode is selected, said buffer control means couples said magnetic disc control unit to one of said at least two of said buffer memory means and said buffer control means couples said read signal generator to said rate control input of said one of said at least two of said memory means for recording digital signals reproduced by said magnetic disc unit in successive memory locations of said one of said at least two of said buffer memory means at a rate corresponding to the rate of said read signal until said one of said at least two of said buffer memory means has recorded digital signals at each of its plurality of memory locations whereupon said buffer control means couples said magnetic disc control unit to a second of said at least two buffer memory means and said buffer control means couples said read signal generator to said rate control input of said second of said at least two buffer memory means for recording digital signals reproduced by said magnetic disc unit in successive memory locations of said second of said at least two buffer memory means at a rate corresponding to the rate of said read signal and said buffer control means couples said demodulator to said one of said at least two buffer memory means and said buffer control means couples said sampling pulse signal to said rate control input of said one of said at least two buffer memory means for reproducing digital signals stored in successive memory locations of said one of said at least two buffer memory means at a rate corresponding to the rate of said sampling pulse signal and for applying said reproduced digital signals to said demodulator until said one of said at least two buffer memory means has reproduced said digital signals stored in each of its plurality of memory locations whereupon said buffer control means couples said demodulator to said second of said at least two buffer memory means and said buffer control means couples said sampling pulse signal to said rate control input of said second of said at least two buffer memory means for reproducing said digital signals stored in successive memory locations of said second of said at least two buffer memory means at a rate corresponding to the rate of said sampling pulse signal for applying said reproduced digital signals to said demodulator, whereby each of said at least two buffer memory means in turn records said digital signals reproduced by said magnetic disc unit and reproduces said recorded

digital signals for applying said recorded digital signals to said demodulator;

and a central processing unit for controlling said sampling pulse signal generator, said modulator, said demodulator, said magnetic disc control means, said buffer memory means and said buffer control means, and said central processing unit being connected to said buffer memory for transferring digital signals therebetween wherein digital signals in said central processing unit are recorded by said magnetic disc unit through said at least two buffer memory means and digital signals recorded by said magnetic disc unit are transferred to said central processing unit through said buffer memory means.

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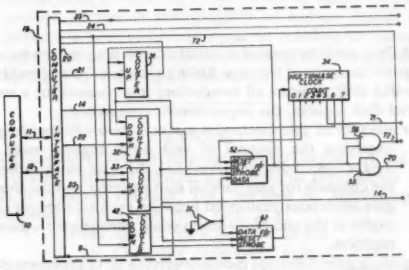
**4,303,989**

## DIGITAL DATA SORTER EXTERNAL TO A COMPUTER

**Robert J. Membrino, Silver Spring, Md., and George D. Gilbreath, Jr., Alexandria, Va., assignors to The Singer Company, Binghamton, N.Y.**

**Filed Jul. 17, 1979, Ser. No. 58,408**
**Int. Cl.³ G06F 7/00**
**U.S. Cl. 364—900** **7 Claims**



1. An electronic sorting system that saves computer software and computer time by sorting random data words that are being stored in selectable locations within a digital computer, said system comprising:

a. an interface that causes the instruction words and data words of a digital computer to be electrically compatible with the remainder of said system so that the instruction and data words may be transferred from said computer;

b. a first counter an input of which is coupled to said interface so that said first counter may receive instruction words from said interface which indicate the start location of the random data that is being stored within a digital computer;

c. a second counter an input of which is coupled to said interface so that said second counter may receive instruction words from said interface which indicate the first location within the digital computer in which the sorted data is going to be stored;

d. a third counter an input of which is coupled to said interface so that said third counter may receive instruction words from said interface which indicate the number of data words that said system has sorted and loaded into the computer;

e. a fourth counter an input of which is coupled to said interface so that said fourth counter may receive instruction words from said interface which indicate the number of random data words that said sorting system has looked at in order to find the next word in the stored list;

f. cyclic timing means coupled to said first counter, said second counter, said third counter and said fourth counter for maintaining said system in synchronization;

g. a first means for storing data words, the output of said first means is coupled to the input of said interface and the input of said first means is coupled to the output of said interface and the output of said timing means;

h. a second means for storing data words, the input of said second means is coupled to the output of said interface, the output of said timing means and the output of said first means;

i. a first means for comparing data words, said first comparing means having two inputs that receive data words the first input being coupled to the output of said interface and the second input being coupled to the output of said first storing means so that said first comparing means may compare the data words appearing at its two inputs and determine the data word that has the greatest value;

j. a second means for comparing data words, said second comparing means having two inputs that receive data words, the first input being coupled to the output of said interface and the second input being coupled to the output of said second storing means so that said second comparing means may compare the data words appearing at its two inputs and determine the data word that has the greatest value; and,

k. means for determining that said first comparing means and said second comparing means have determined the data words that have the highest value, the inputs of said determining means are coupled to the output of said first comparing means, said second comparing means and said timing means and the output of said determining means is coupled to the input of said first storing means, whereby at the beginning of the sort said first storing means is set to its highest value and said second sorting means is set to zero whereupon each data word in the unsorted list is compared by said first and second comparing means in order to find data words that have a greater value than what is stored in said second storing means and a lesser value than what is stored in said first storing means, thence respectively stored in said first storing means until all the data words in the sorted list are compared, thence the data word currently stored in said first storing means is loaded into the computer, and said first storing means is set to its maximum value and said second storing means is set to the last value entered into the sorted list so that at the end of the sort a sequence of data words will be found and listed in the computer in ascending order.

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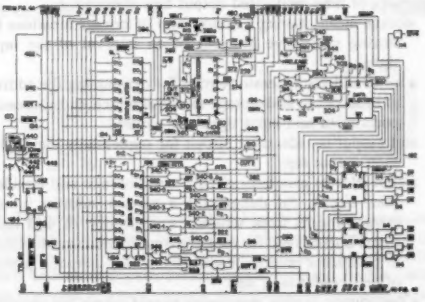
**4,303,990**

## PROGRAMMABLE CONTROLLER USING MICROPROCESSOR

**William H. Seipp, Bettendorf, Iowa, assignor to Gulf & Western Industries, Inc., New York, N.Y.**

**Continuation of Ser. No. 915,069, Jun. 12, 1978, abandoned, which is a division of Ser. No. 701,858, Jul. 1, 1976, Pat. No. 4,107,785. This application Jan. 2, 1980, Ser. No. 109,164**
**Int. Cl.³ G06F 9/00**
**U.S. Cl. 364—900** **7 Claims**



7. In a programmable controller including a microprocessor having output address terminals connected to address lines

connectable to said address terminals, input/output bi-directional data terminals, and means in said microprocessor connected to the input/output bi-directional data terminals for applying a binary status code made up of binary signals to said data terminals during a particular type of machine cycle of said microprocessor and indicative of the type of machine cycle to be processed by said microprocessor, and means for latching connected to the input/output bi-directional data terminals, which latches said binary status code into a series of hardwired logic terminals at the output side of a data latch, the improvement comprising: a logic circuit having input terminals and output terminals for creating one of a series of control signals in said output terminals in response to input logic signals at said input terminals; means for connecting at least one of said hrdwired logic terminals to a selected one of said input terminals of said logic circuit; and, means for selectively connecting at least one of said address lines to respective ones of said input terminals of said logic circuit, said respective ones of said input terminals of said logic circuit being different from said selected one of said input terminals of said logic circuit whereby the signal at the output terminals of said logic circuit is controlled by both the binary signals of said sttus code and the logic on at least one address line.

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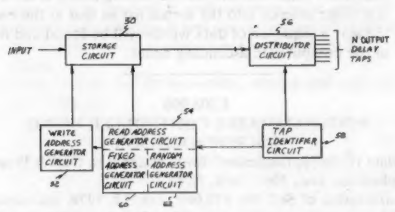
**4,303,991**

## TIME-MODULATED DELAY SYSTEM

**Christopher H. Moore, 53 Lawndale St., Belmont, Mass. 02178**

**Division of Ser. No. 31,585, Apr. 19, 1979, Pat. No. 4,268,717.**
**This application Feb. 28, 1980, Ser. No. 125,670**
**Int. Cl.[3] G06F *13/06***
**U.S. Cl. 364—900** **12 Claims**




12

1. A time-modulated delay system having an input and a plurality of time-modulated output taps comprising:

storage means having a multiplicity of storage locations for storing successive portions of an interval of the input signal;

a write address generator circuit for designating the address of locations in said storage means at which said successive portions of said input signal are stored;

and output tap identifier circuit for sequentially identifying each output tap;

a read address generator circuit, responsive to said tap identifier circuit, for designating a random address in said storage means from which a said portion of said input signal is to be read for each time-modulated tap identified, to produce a random modulation of the temporal pattern of said output taps; and

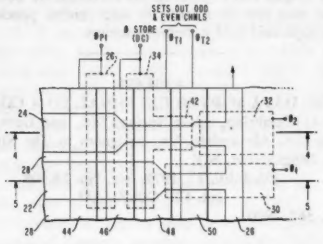
a distribution circuit, responsive to said output tap identifier circuit, for delivering each said portion of said input signal read out of said storage means to the corresponding identified tap.

**4,303,992**

## SERIAL PARALLEL CHARGE COUPLED DEVICE EMPLOYING A GATE SPLITTING DEVICE

**Keith G. Barkley, Hopewell Junction; Majid Ghafghaichi, Poughkeepsie; Yelandur R. Gopalakrishna, Wappingers Falls, and Albert J. Tzou, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 13, 1980, Ser. No. 149,377**
**Int. Cl.[3] G11C *13/00, 11/42***
**U.S. Cl. 365—51** **6 Claims**




1. In a serial to parallel to serial charge coupled device shift register memory of the type having channels for a plurality of parallel shift registers all terminating in a channel for a single serial shift register, the improvement comprising,

a plurality of gate electrodes means of two different lengths overlying the channel of said serial register with the longer electrodes also overlying the ends every other of the channels for said parallel shift registers and the shorter gate electrodes positioned between each two longer electrodes at the end of the intervening channels for a parallel registers,

a single gate electrode means overlying all of the channels of said parallel shift adjacent to said plurality of said gate electrodes and having extensions juxtaposed between said longer electrodes and facing said shorter electrodes, and

transfer electrode means overlying said longer of the plurality of gate electrodes and said extensions for transfer of data from said parallel registers to said serial registers in two groups.

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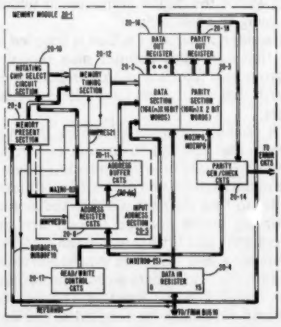
**4,303,993**

## MEMORY PRESENT APPARATUS

**William Panepinto, Jr., Tewksbury, and Chester M. Nibby, Jr., Peabody, both of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.**

**Filed Oct. 10, 1979, Ser. No. 83,438**
**Int. Cl.[3] G11C *13/00***
**U.S. Cl. 365—230** **31 Claims**




1. A memory subsystem comprising at least one memory

module board coupled to receive a plurality of address signals specifying a memory location to be accessed within said subsystem, said board including a control section and a memory section having a predetermined number of physical row locations of memory chips, said predetermined number of rows of memory chips corresponding to a segment of addressable memory space and each row of chips corresponding to an increment of memory space, said control section including:

range switch means connected for receiving a first portion of said plurality of address signals coded to specify said segment and said range switch means being selectively positioned to generate coded signals specifying one of a predetermined number of segments in response to said first portion;

circuit means connected to receive said coded signals from said range switch means and being operated to logically combine said coded signals to generate a resulting signal;

register means for receiving another portion of a plurality of address signals coded for specifying said increment of said locations to be accessed; and,

memory present circuit means coupled to said circuit means and to said register means, said memory present circuit means being conditioned by said resulting signal and said another portion of said plurality of address signals to generate a memory present signal for enabling the accessing of a location within said increment of said one segment specified by said range switch means.

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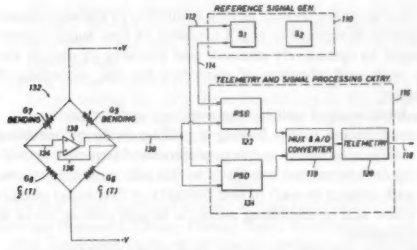
**4,303,994**

## SYSTEM AND METHOD FOR MONITORING DRILL STRING CHARACTERISTICS DURING DRILLING

**Denis R. Tanguy, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.**

**Filed Apr. 12, 1979, Ser. No. 29,423**
**Int. Cl.³ G01V 1/40; G01C 9/14**
**U.S. Cl. 367—35** **13 Claims**




1. A system operable during the drilling of a borehole for generating a direction signal representative of the direction which the drill bit of a drill string will take during continued drilling, the drill string being of the type which is rotated during drilling of the borehole, comprising:

a. a reference signal generator coupled to the drill string for generating during drilling a reference signal indicative of the rotational orientation of the drill string about its axis with respect to a directional reference;

b. a strain signal generator coupled to said drill string for generating during drilling a strain signal indicative of the lateral forces applied to said drill bit as a function of the rotational orientation of the drill string; and

c. telemetering and processing circuitry coupled to receive said strain signal and said reference signal for generating said direction signal to represent the phase between said strain and reference signals, thereby to represent the direction of the resultant of said lateral forces as a function of said directional reference.

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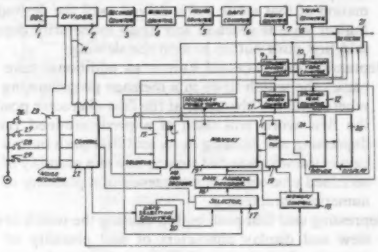
**4,303,995**

## ELECTRONIC TIMEPIECE WITH CALENDAR DISPLAY ARRANGEMENT

**Hitomi Aizawa, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan**

**Filed Dec. 29, 1978, Ser. No. 974,401**
**Claims priority, application Japan, Dec. 29, 1977, 52/159317**
**Int. Cl.³ G04B 19/24**
**U.S. Cl. 368—28** **14 Claims**



1. In an electronic timepiece including timekeeping circuit means for producing a low frequency timing signal, a plurality of series connected timekeeping counters for producing timekeeping signals representative of time information and calendar information in response to said low frequency timing signal being applied thereto, first display means for displaying at least one of time information and calendar information in response to said timekeeping signals representative of time being applied thereto and second display means for displaying calendar information representative of a multiplicity of dates for a predetermined interval of time the improvement comprising a calendar display memory means coupled to at least said second display means, said calendar display memory means being adapted to store a plurality of predetermined calendar information dates therein and operative means selectively coupled to said memory means and said second display means for simultaneously rendering visually distinguishable certain of said dates in said second display means, said visually distinguishable dates being representative of the calendar information dates stored in said memory means.

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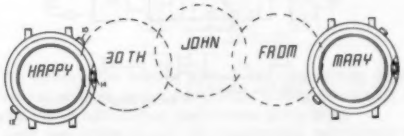
**4,303,996**

## USER PROGRAMMABLE ALPHA-NUMERIC MESSAGE WATCH

**Lawrence S. Schmitz, Costa Mesa, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Continuation of Ser. No. 924,029, Jul. 12, 1978, abandoned, which is a continuation of Ser. No. 758,604, Jan. 12, 1977, abandoned. This application Mar. 10, 1980, Ser. No. 128,689**
**Int. Cl.³ G04C 19/00, 9/00**
**U.S. Cl. 368—82** **2 Claims**




1. The method of displaying horological and alpha-numeric information, of setting horological information and of programming alpha-numeric message information, in a watch with a first and second push button and a recessed button, said watch having a watch display, said displayed alpha-numeric information including a sequence of words each having a plurality of character positions for displaying characters, comprising the steps of:

depressing said first push button a predetermined number of times which causes horological information to be displayed by said watch display;

depressing said second push button, which causes the programmed alpha-numeric message information to be sequentially displayed by said watch display;

depressing said recessed button a predetermine number of times which causes the watch to be in one of a plurality of horological setting modes, momentarily depressing said first push button which then causes the horological information of that mode to be slewed until the desired horological state is reached and again monetarily depressing said first push button to stop the slewing;

depressing said recessed button an additional time which causes the watch to be in a message programming mode, whereupon the character at the first character position of the first word will flash at a predetermined rate, and depressing and holding in on said first push button which causes the watch to fast slew to one of a plurality of predetermined characters in a sequence of a plurality of alphanumeric characters;

depressing said first push button causing the watch to slowly slew and display characters of said plurality of alphanumeric characters until the watch user depresses said first push button again causing the watch display to stop on the desired character;

depressing said second push button while in said message programming mode which causes the watch display to advance to the next character position of the particular word being programmed and when the watch display has advanced to the last character position of the particular word, causes the watch display to then return to the first character position of the particular word;

depressing said recessed button an additional time which causes the setting to be advanced from the first character position of a particular word to the first character position of the next word; and

when said watch has advanced through the character positions and returned to the first character position of the last word of said sequence of words, depressing said recessed button an additional time to remove said watch from said message setting mode.

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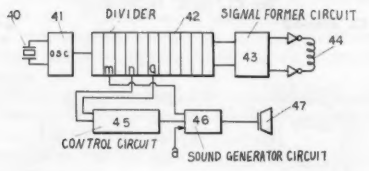
**4,303,997**

## ANALOG ALARM TIMEPIECE

**Toshiaki Saito, Suwa, Japan, assignor to Suwa Seikosha Co., Ltd., Suwa, Japan**

**Continuation-in-part of Ser. No. 947,890, Oct. 2, 1978, abandoned. This application Feb. 22, 1980, Ser. No. 123,844**
**Claims priority, application Japan, Oct. 17, 1977, 52-124265**
**Int. Cl.³ G04C *21/16***
**U.S. Cl. 368—259** **8 Claims**




1. In a miniaturized analog quartz crystal timepiece having a quartz crystal vibrator as a time standard, a step motor for driving a display mechanism of timepiece and an electric sound generator, the improvement comprising:

a battery for driving said step motor and said sound generator;

a divider made up of a plurality of divider stages to divide frequency of said quartz crystal vibrator into low frequency for timepiece;

first circuit means connected with said divider to produce an intermittent signal for driving said step motor; and

second circuit means connected with said divider to produce an intermittent signal for driving said sound generator;

whereby said intermittent signal for driving said sound generator supplied from said second circuit means is out of phase with said intermittent signal for driving said step motor supplied form said first circuit means, and the phase difference is wider than pulse width of said intermittent signal for driving said step motor.

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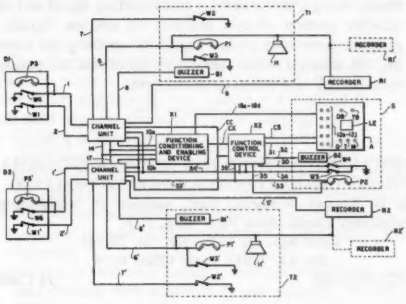
**4,303,998**

## DICTATION RECORDING SYSTEM

**Luther C. Plunkett, Jr., Atlanta, Ga., assignor to Lanier Business Products, Inc., Atlanta, Ga.**

**Continuation of Ser. No. 756,387, Jan. 3, 1977, abandoned. This application Jul. 10, 1978, Ser. No. 923,178**
**Int. Cl.³ G11B *5/00, 27/36***
**U.S. Cl. 369—29** **24 Claims**




1. In a recording system having a plurality of dictate stations; a plurality of recorders; and a plurality of first audio circuits arranged to operatively connect said plurality of dictate stations with said plurality of recorders for the recording of dictation;

a central control unit having a second audio circuit;

a conditioning means having a polling mode of operation and for alternately and in predetermined sequence providing an intermittent condition within said recording system with respect to each of said plurality of first audio circuits when said conditioning means is in said polling mode of operation;

a function selecting means associated with said central control unit and selectively operable to provide a function signal condition corresponding to a selection of a particular one of said plurality of first audio circuits for one of a plurality of functions operatively connecting said second audio circuit and said one of said plurality of first audio circuits in response to said channel function signal condition coinciding with said intermittent condition with respect to one of said plurality of first audio circuits;

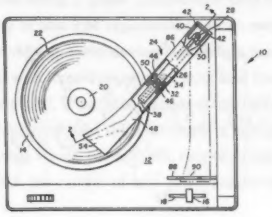
a function enabling means for rendering said recording system operative to provide said one of a plurality functions in response to said channel function signal condition coinciding with said intermittent condition with respect to one of said plurality of first audio circuits;

function control means for terminating said polling mode of operation of said conditioning means in response to the establishment of said one of a plurality of functions by said function enabling means and for reestablishing said polling mode of operation of said conditioning means in response to termination of said one of a plurality of functions.

## 4,303,999
## PHONOGRAPH HAVING AN IMPROVED TONE ARM ASSEMBLY

**Ronald D. Irvin, Poway, Calif., assignor to The Quaker Oats Company, Chicago, Ill.**

**Filed Jan. 18, 1980, Ser. No. 113,748**
**Int. Cl.³ G11B** *3/14, 3/20, 17/06*
**U.S. Cl. 369—75** **10 Claims**



1. A phonograph having a turntable for receiving a record and an improved tone arm assembly comprising in combination:

a support arm having a pivot end thereof mounted on the phonograph for pivotal movement of said arm in a horizontal plane substantially parallel to and spaced above the turntable;

a tone arm housing;

means for mounting said tone arm housing on said support arm for horizontal pivotal movement in unison therewith between rest and playing positions, and for vertical pivotal movement relative to said support arm by gravity to a normal position toward but spaced from the turntable;

stop means on said support arm for stopping said tone arm housing in its normal position;

a needle-cartridge carrying arm;

means for mounting said needle-cartridge carrying arm on said tone arm housing for vertical pivotal movement relative thereto with said needle engaging a record on the turntable when said tone arm housing is in its normal position; and

spring means coupled to said needle-cartridge carrying arm for providing the only force in addition to the weight of said needle-cartridge carrying arm for urging said needle into engagement with the record.

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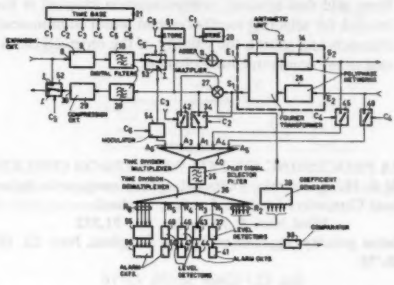
## 4,304,000
## DEVICE FOR SUPERVISING A TRANSMULTIPLEXER

**Georges Bonnerot, Orsay; Patrice Senn, Feucherolles, and Michel Coudreuse, Paris, all of France, assignors to Telecommunications Radioelectriques et Telephoniques T.R.T., Paris, France**

**Filed May 21, 1979, Ser. No. 41,041**
**Claims priority, application France, May 29, 1978, 78 15891**
**Int. Cl.³ H04J** *4/00, 1/05*
**U.S. Cl. 370—70** **2 Claims**

1. A digital transmultiplexer for converting a signal consisting of a plurality of telephony signals in TDM-Format, into a signal consisting of the telephony signals in FDM-Format and vice versa, the transmultiplexer comprising an arithmetic unit having a first input and a first output for respectively receiving and supplying, in digital form, said signals in TDM-Format and a second input and a second output for respectively receiving and supplying, in digital form, said signals in FDM-Format, a digital generator also coupled to the first input of said arithmetic unit for generating a pilot signal having a prescribed frequency for said TDM-Format signal to be converted, and filter means coupled to the first output of said arithmetic unit for selecting a pilot signal contained in the signal at said first output for controlling the level of the received FDM-Format signals; wherein, to monitor the proper operation of said arithmetic unit, said transmultiplexer further comprises means coupled to said arithmetic unit for supplying the signals present at said first input, said second input and said second output of said arithmetic unit, as well as the signal present at said first output of said arithmetic unit, to said filter means, whereby said filter means select a signal component having said prescribed frequency from each of said signals supplied thereto, a plurality of



detection circuits each for generating a level signal relating to each of said signal components, respectively, and for comparing said respective level signals to respective thresholds, means for coupling said filter means to said detection circuits and means for utilizing the level signals for controlling the level of multiplexed signals.

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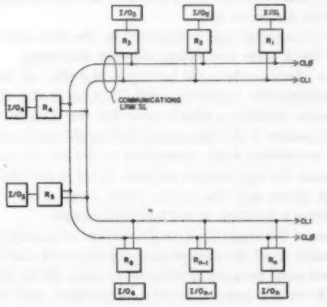
## 4,304,001
## INDUSTRIAL CONTROL SYSTEM WITH INTERCONNECTED REMOTELY LOCATED COMPUTER CONTROL UNITS

**Michael E. Cope, Richardson, Tex., assignor to Forney Engineering Company, Addison, Tex.**

**Filed Jan. 24, 1980, Ser. No. 115,161**
**Int. Cl.³ G06F** *11/08, 11/16*
**U.S. Cl. 371—8** **45 Claims**



1. An information transfer system for transmitting digital information between active devices and testing the validity of the transmitted information, said system comprising:

at least one active device for transmitting information in digital form;

at least one other active device for receiving information in digital form;

plural independent communication channels connected to and extending between said first-mentioned and said second-mentioned active devices for conveying information therebetween;

said first-mentioned active device including a transmission means for transmitting digital information arranged in blocks of predetermined format, said transmission means

transmitting an identical block on each of said plural communication channels; and

said second-mentioned active device including receiving means for receiving digital information transmitted by said first-mentioned active device and for selecting one of said plural communication channels and testing the validity of the received block and, when said received block from said first-selected communication channel is found invalid, for selecting another of said plural communication channels and testing the validity of the received block on said other communication channel.

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4,304,002

## DATA PROCESSING SYSTEM WITH ERROR CHECKING

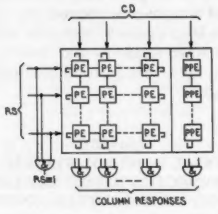
David J. Hunt, Hitchin, United Kingdom, assignor to International Computers Limited, London, England

Filed Nov. 5, 1979, Ser. No. 91,552

Claims priority, application United Kingdom, Nov. 23, 1978, 45858/78

Int. Cl.[3] G06F *11/10, 15/16*

U.S. Cl. 371—49 7 Claims




1. A data processing system comprising:

(a) a plurality of substantially identical data processing elements each of which includes

(i) a data store having a plurality of individually addressable locations and

(ii) processing logic connected to the data store;

(b) a check code processing element including

(i) a check code store having a plurality of individually addressable locations, each location in the check code store holding a check code for the data in the set of locations in the data stores having the same address, and

(ii) processing logic connected to the check code store;

(c) means for applying an address signal in parallel to all the data stores and also to the check code store, to thereby address a location in each of said stores;

(d) means for applying a single stream of control signals in parallel to all the data processing elements and also to the check code processing element to cause all the elements to perform the same operation in parallel, and thereby to produce respective output signals;

(e) checking means connected to the data processing element and also to the check code processing element, for combining the output signals of the data processing element and check code processing element to produce a signal indicative of whether there is an error in the output signals from the data processing elements;

(f) logic circuit means connected to receive said control signals, for deducing from said control signals whether the output signal from the check code processing element is a valid check code; and

(g) means responsive to the logic circuit means, for suppressing the output signal from the checking means in the event that the output from the check code processing element is not a valid check code.

4,304,003

## APPARATUS CONTROLLED BY A MICROPROCESSOR

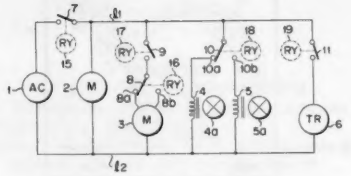
Toshio Kakizawa, Kuwana, and Itsuo Sakai, Inuyama, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Oct. 19, 1979, Ser. No. 86,332

Claims priority, application Japan, Oct. 31, 1978, 53-134244

Int. Cl.[3] G01R *31/28;* G06F *11/00*

U.S. Cl. 371—62 7 Claims




1. An apparatus controlled by a microprocessor comprising:

an integrated microprocessor including:

a time counting logic means supplied with a reference input signal for counting said input signal and producing a first signal,

a main control logic means receiving said first signal for producing a second signal and at least one output signal for controlling said apparatus, and

an AC signal generating logic means receiving said first and second signals for producing an AC signal and a third signal, said AC signal being produced at a first operation state of said microprocessor and having a first and second levels repeated alternatively, said third signal being produced at a second operation state of said microprocessor and having one of said first and second levels for a predetermined time period;

a detecting means for detecting said AC signal to produce a first detection signal and for detecting said third signal to produce a second detecting signal; and

a protecting means connected to said detecting means and applying a fourth signal to said apparatus for putting said apparatus into a safety condition when said protecting means receives said first detection signal.

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4,304,004

## APPARATUS FOR TRANSMISSION AND RECEPTION OF FREQUENCY MODULATED DIGITAL COMMUNICATION SIGNALS

Hans J. von der Neyen, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jan. 30, 1980, Ser. No. 116,961

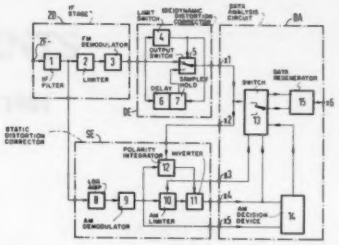
Claims priority, application Fed. Rep. of Germany, Feb. 13, 1979, 2905471

Int. Cl.[3] H04L *27/14;* H04B *1/10*

U.S. Cl. 375—88 6 Claims

1. A system for reception of digital communication signals which are impressed onto a carrier in the form of binary frequency modulation and radiated through a propagation medium which is subject to reflection, particularly, for reception in mobile stations wherein unsatisfactory reception which occurs as a result of phase and amplitude distortions is automatically detected to determine their origins with two supplemental arrangements, comprising receiving means including an IF stage receiving incoming signals, an FM demodulator receiving an input from said IF stage, an AM demodulator receiving an input from said IF stage, a dynamic distortion corrector receiving the output of said FM demodulator, a polarity integrator receiving an output of said dynamic distortion corrector and an input from said AM demodulator, an AM limiter receiving an output of said AM demodulator, an inverter

receiving an output of said polarity integrator and an output of said AM limiter, a data analysis circuit receiving the output of said dynamic distortion corrector and outputs from said AM limiter, said inverter, and said AM demodulator, said data analysis circuit including an FM regenerator which receives the output of said dynamic distortion corrector, a phase follow-up device including a phase comparator (Ph) which receives the output of said FM regenerator and an output from said inverter, an AM decision device including a time evaluation circuit (ZB) which receives outputs from said inverter and said AM demodulator, a bistable trigger stage (BK2) which receives the output of said time evaluation circuit ZB, a change-over switch which receives the output of said bistable trigger stage BK2, the output of said phase follow-up device, the output of said AM limiter and the output of said inverter, said change-over switch controlled by the output of said bistable trigger stage, and a data regenerator receiving the output of said change-over switch.



# DESIGN PATENTS

## GRANTED DEC. 1, 1981

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| D34–012 | 262,100 |

DECEMBER 1, 1981

262,070

**BOXING HEADGUARD**

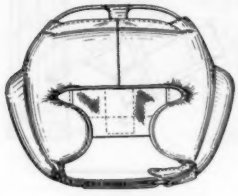
John L. Toms, Bellport, N.Y., assignor to Everlast World's Boxing Headquarters Corp., Bronx, N.Y.

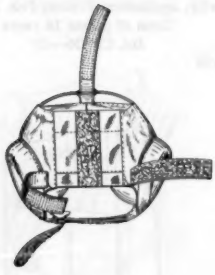
Filed Nov. 15, 1978, Ser. No. 960,869

Term of patent 14 years

Int. Cl. D02—*03*

U.S. Cl. D2—232





262,071

**BELT BUCKLE**

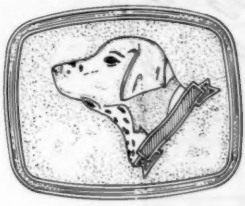
Ryk Van Brouwer, Los Angeles, Calif., assignor to Raintree Buckle & Jewelry, Inc., Los Angeles, Calif.

Filed Aug. 7, 1979, Ser. No. 64,429

Term of patent 14 years

Int. Cl. D02—*07*

U.S. Cl. D2—440



262,072

**TENNIS BAG**

Micheal Pfeiffer, Holzkirchen, Fed. Rep. of Germany, assignor to Pfeiffer Gesellschaft mbH, Munich, Fed. Rep. of Germany

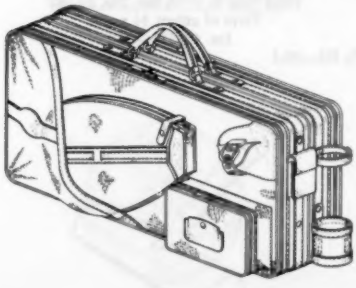
Filed Jul. 25, 1979, Ser. No. 60,619

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1979, MR11611

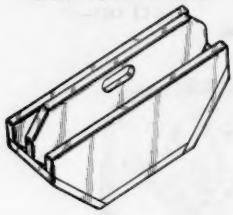
Term of patent 14 years

Int. Cl. D3—*02*

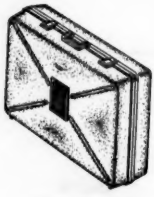
U.S. Cl. D3—36



262,073
CYMBAL HOLDER
Roy D. Zimmerman, P.O. Box 6431, South Bend, Ind. 46660
Filed Jul. 26, 1979, Ser. No. 61,078
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D3—73

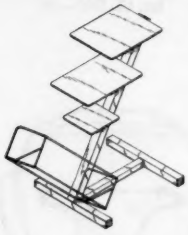


262,074
CASE FOR PORTABLE ELECTRONICS
Jack S. Schnabel, Sausalito, Calif., assignor to Security Rental Systems, Inc., Napa, Calif.
Filed Mar. 3, 1980, Ser. No. 126,538
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D3—76



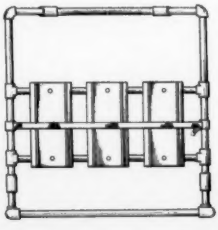
262,075
COMBINED PAINT APPLICATOR AND ROLLER THEREFOR
Donald R. Cooke, Minneapolis, Minn., assignor to Padco, Inc., Minneapolis, Minn.
Filed May 8, 1979, Ser. No. 37,180
Term of patent 14 years
Int. Cl. D4—*04*
U.S. Cl. D4—38.1

262,076
COMBINED RECORD OR TAPE RACK AND STEREO COMPONENT SUPPORT STAND
David J. Pracon, 450 Griswold Rd., Wethersfield, Conn. 06109
Filed Feb. 13, 1979, Ser. No. 13,961
Term of patent 14 years
Int. Cl. D06—*04*
U.S. Cl. D6—29

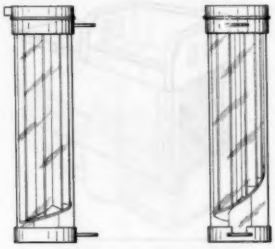


262,077
ARM CHAIR OR SIMILAR ARTICLE
Didier Deconinck, Seyssins, France, assignor to Allibert Exploitation, Grenoble, France
Filed Aug. 13, 1979, Ser. No. 65,849
Claims priority, application France, Feb. 15, 1979, 79 2511
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—70

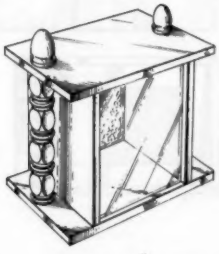
262,078
PORTABLE CARRYING RACK FOR PRESSURIZED AIR CONTAINERS
Jeffrey L. Newton, 3515 Broadway, Apt. 6, West Palm Beach, Fla. 33407
Filed Oct. 2, 1978, Ser. No. 947,869
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—85



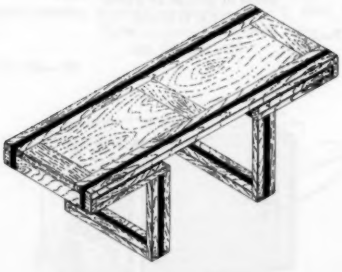
262,079
**DRILL DISPLAY HOLDER**
Thomas R. Rankin, 20374 Westover Ave., Rocky River, Ohio 44116
Filed May 17, 1979, Ser. No. 39,804
Term of patent 7 years
Int. Cl. D20—*02*
U.S. Cl. D6—127



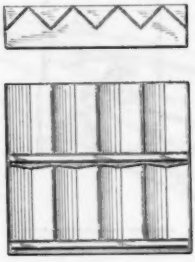
262,080
**DISPLAY CASE FOR WEDDING CAKE DECORATION**
Ronald L. Dunn, 218 E. Packard Ave., Fort Wayne, Ind. 46806
Filed Jun. 16, 1980, Ser. No. 160,020
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—174



262,081
**DESK**
Clifford S. Isbell, 234 S. Lafayette, Denver, Colo. 80209
Filed Feb. 9, 1979, Ser. No. 11,052
Term of patent 7 years
Int. Cl. D6—*03*
U.S. Cl. D6—177

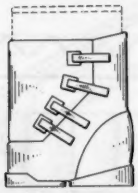


262,082
**DISPLAY RACK MODULE**
Hal D. Sandy, 4937 Glendale Rd., Shawnee Mission, Kans. 66205
Filed Apr. 28, 1980, Ser. No. 144,241
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—189

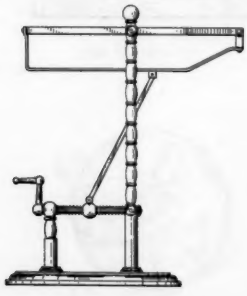


262,083
**COMBINED COVER AND SIPPING TUBE HOLDER FOR A TUMBLER**
Carole L. Adamo, Miramar, Fla., assignor to No Spill Inc., Ft. Lauderdale, Fla.
Filed May 23, 1977, Ser. No. 799,571
Term of patent 3½ years
Int. Cl. D07—*01*
U.S. Cl. D7—40

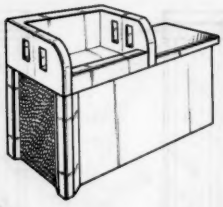
262,084
JACKET-TYPE COASTER
M. Dean Hayden, Jr., 3937 S. 500 East, Salt Lake City, Utah 84107
Filed Aug. 6, 1979, Ser. No. 64,296
Term of patent 14 years
Int. Cl. D07—*06*
U.S. Cl. D7—45



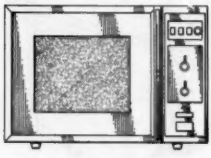
262,085
DECANTING CRADLE FOR A WINE BOTTLE OR THE LIKE
Derek J. Petley, 19 Chapel Ave., Addlestone, Surrey, England
Filed Mar. 31, 1980, Ser. No. 135,572
Claims priority, application United Kingdom, Dec. 10, 1979, 992754/79
Term of patent 14 years
Int. Cl. D07—*06*
U.S. Cl. D7—70



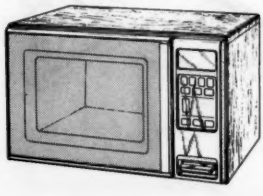
262,086
CONCRETE OUTDOOR COOKING GRILL
James E. Miller, 655 Ridgedale, Birmingham, Mich. 48008
Filed Jan. 18, 1980, Ser. No. 113,368
Term of patent 14 years
Int. Cl. D07—*02*
U.S. Cl. D7—107



262,087
MICROWAVE OVEN
Yoshio Suganoya, and Takao Miyake, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed May 25, 1979, Ser. No. 42,285
Claims priority, application Japan, Dec. 4, 1978, 53-51507
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—128



262,088
MICROWAVE OVEN
Masamichi Yamamura, Osaka; Yoichi Takahashi, Kouriyama; Toshio Harada, and Shigefumi Inoue, both of Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Sep. 17, 1979, Ser. No. 75,876
Claims priority, application Japan, Mar. 16, 1979, 54-10692
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—128

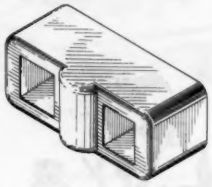


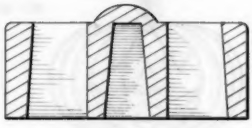
262,089

**CHOPSTICK HOLDER**

Noel A. Fahy, 9 Borgnis St., Davidson, New South Wales 2085, Australia

Filed Aug. 20, 1979, Ser. No. 68,264
Claims priority, application Australia, Feb. 23, 1979, 77159
Term of patent 14 years
Int. Cl. D07—*03*
U.S. Cl. D7—152



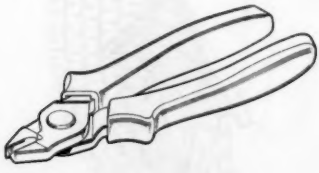


262,090

**CUTTING NIPPERS**

Ulf H. Wahlberg, Enköping, Sweden, assignor to Aktiebolaget Bahco Verktyg, Enköping, Sweden

Filed Sep. 29, 1977, Ser. No. 837,949
Claims priority, application Sweden, May 2, 1977, 770987
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—58

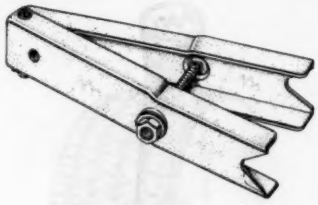


262,091

**SPRING COMPRESSOR**

Mark A. Steck, Miamisburg, and George L. Steck, West Carrollton, both of Ohio, assignors to Steck Manufacturing Co., Inc., Dayton, Ohio

Filed Mar. 28, 1979, Ser. No. 24,588
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—72

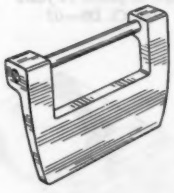


262,092

**HANDLE LOOP FOR LUGGAGE OR THE LIKE**

Joseph Y. Pelavin, North Bergen, N.J., assignor to CPG Products Corp., Minneapolis, Minn.

Filed May 21, 1979, Ser. No. 41,442
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—321

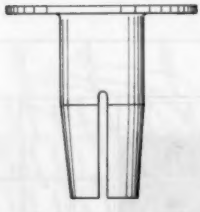


262,093

**PLASTIC SAFETY CAP FOR PLACEMENT OVER THE PROJECTING SHARP ENDS OF CONCRETE REINFORCING BARS**

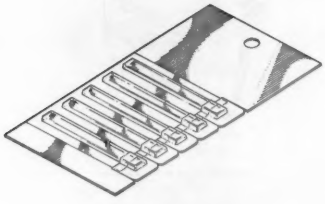
Lyman F. Bush, 1217 - 122nd St. Ct. E., Tacoma, Wash. 98445, and Dennis R. Weaver, 4614 Ray Nash Dr. NW., Gig Habor, Wash. 98335

Filed Jan. 17, 1979, Ser. No. 4,084
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D8—386

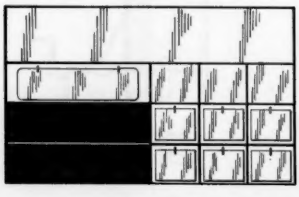


262,094
DISPENSING CONTAINER FOR CREAM OR GEL MATERIALS OR THE LIKE
Charles J. Tiboldo, Wayne, N.J., assignor to American Cyanamid Company, Stamford, Conn.
Filed Feb. 2, 1978, Ser. No. 874,605
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—302

262,095
PACKAGING CONTAINER FOR NEEDLES OR THE LIKE
Masamitsu Takahashi, Hiroshima, Japan, assignor to Bankoku Needle Mfg. Co., Ltd., Hiroshima, Japan
Filed May 7, 1979, Ser. No. 36,600
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—303



262,096
TENNIS SCOREBOARD OR THE LIKE
Sherman L. Riggsbee, Rte. 3, Box 528, Chapel Hill, N.C. 27514
Filed Oct. 13, 1978, Ser. No. 951,005
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D10—46.1

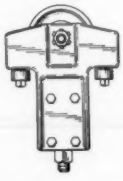


262,097
ARTIFICIAL TREE OR SIMILAR ARTICLE
Louis H. Weixelman, Wamego, Kans., assignor to George J. Muckenthaler, Kettering, Ohio, a part interest
Filed Mar. 17, 1978, Ser. No. 887,645
Term of patent 14 years
Int. Cl. D11—*04*
U.S. Cl. D11—118

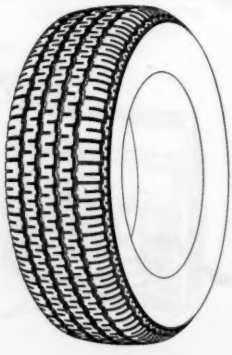
262,098
WALL PLAQUE
Karen D. Odle, 2731 E. McDowell Rd., Phoenix, Ariz. 85008
Filed Mar. 3, 1980, Ser. No. 126,873
Term of patent 14 years
Int. Cl. D11—*02*; D21—*01*
U.S. Cl. D11—133

262,099
ARMORED TRUCK
Russell H. Harding, Westport, Conn., assignor to Brink's Incorporated, Darien, Conn.
Filed Mar. 5, 1979, Ser. No. 17,384
Term of patent 14 years
Int. Cl. D12—*13*
U.S. Cl. D12—12

262,100
ARTICULATING CARRIER HEAD
John F. Miller, P. O. Box 277, Howell, Mich. 48843
Filed Mar. 15, 1979, Ser. No. 20,664
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D34—35



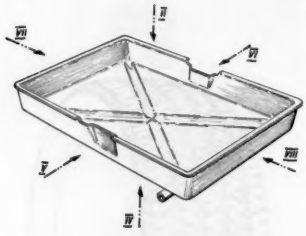
262,101
TIRE
André E. J. Baus, Colmar-Berg, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Feb. 21, 1979, Ser. No. 13,592
Claims priority, application United Kingdom, Sep. 20, 1978, 986441
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—143



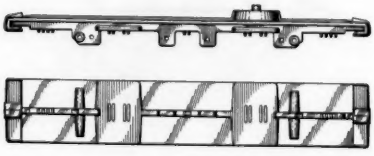
262,102
TIRE
André E. J. Baus, Colmar-Berg; Jean F. L. Fontaine, Ingeldorf, and Brian L. Ham, Mertzig, all of Luxembourg, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Feb. 21, 1979, Ser. No. 13,591
Claims priority, application United Kingdom, Nov. 3, 1978, 987125/78
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—147

262,103
MOTORCYCLE SADDLE BAG
Thomas S. Beaubien, Rancho Palos Verdes; Robert E. Oehring, Norwalk, and Dennis C. Rich, Long Beach, all of Calif., assignors to Bates Industries, Inc., Long Beach, Calif.
Filed Jun. 9, 1980, Ser. No. 157,468
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—158

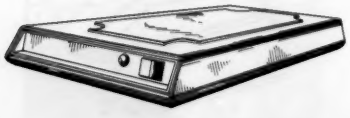
262,104
OVERFLOW TRAY FOR A CAR BATTERY
Ross M. Simpson, 7/165 Sydney Rd., Fairlight, New South Wales, 2094, Australia
Filed Aug. 23, 1979, Ser. No. 69,042
Claims priority, application Australia, May 3, 1979, 77747
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D13—10




262,105
SIDE PANEL FOR READILY DISASSEMBLED INSTRUMENT HOUSING
Peter A. Peroni, Pottstown, Pa., assignor to LaFrance Corporation, Philadelphia, Pa.
Filed May 10, 1979, Ser. No. 37,676
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—114

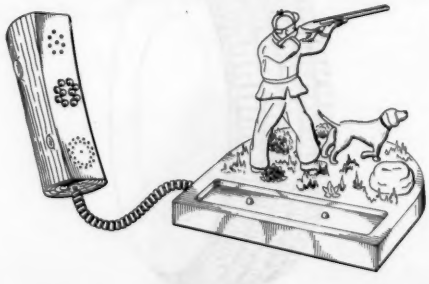


262,106
DATA MODEM
John R. Frassanito, San Antonio, Tex., assignor to Universal Data Systems, Inc., Huntsville, Ala.
Filed Jul. 26, 1979, Ser. No. 60,860
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—107



262,107
TELEPHONE
Wesley L. Thomas, 109 S. Catalina St., Los Angeles, Calif. 90004
Filed May 7, 1979, Ser. No. 36,584
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53

262,108
TELEPHONE
Wesley L. Thomas, 109 S. Catalina St., Los Angeles, Calif. 90004
Filed Jul. 13, 1979, Ser. No. 57,279
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53



262,109
**COMBINED PORTABLE TELEVISION RECEIVER AND RADIO**

Isao Sekita, Kyoto; Kenichi Ito, Kawanishi; Kiyoshi Suzuki, Ibaraki; Kazuyoshi Sugisaki; Masaki Yamamoto, both of Kyoto, and Kazunori Mano, Ibaraki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

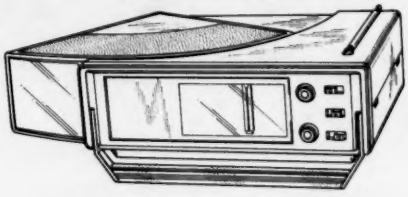
Filed Mar. 5, 1980, Ser. No. 127,359

Claims priority, application Japan, Sep. 10, 1979, 54-37927

Term of patent 14 years

Int. Cl. D14—*03*

U.S. Cl. D14—70



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262,110
**PORTABLE RADIO**

Kazumasa Takenaka, Katano; Katsutoshi Kido, Kyoto, and Yoichi Hisano, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed May 29, 1980, Ser. No. 154,257

Claims priority, application Japan, Dec. 20, 1979, 54-53698

Term of patent 14 years

Int. Cl. D14—*03*

U.S. Cl. D14—70

262,111
**PORTABLE RADIO**

Iwao Nakajima, Ikoma; Sadayoshi Azuma, Hirakata; Kunio Hoshino, Katano, and Benito Mishiro, Sakai, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jun. 10, 1980, Ser. No. 158,090

Claims priority, application Japan, Dec. 20, 1979, 54-53697

Term of patent 14 years

Int. Cl. D14—*03*

U.S. Cl. D14—70

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262,112
**TELEGRAPH KEY**

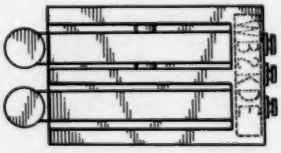
Antonio J. Anzevino, 12 Lakeview Rd., Carmel, N.Y. 10512

Filed May 1, 1978, Ser. No. 901,765

Term of patent 14 years

Int. Cl. D14—*03*

U.S. Cl. D14—93



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262,113
**HIGH PRESSURE PUMP**

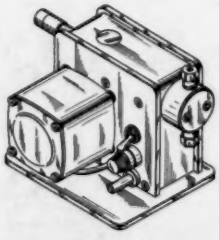
Emmett L. Durrum, Menlo Park, Calif., assignor to Eldex Laboratories, Inc., Menlo Park, Calif.

Filed Feb. 6, 1979, Ser. No. 9,781

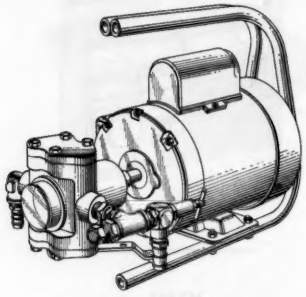
Term of patent 14 years

Int. Cl. D15—*02*

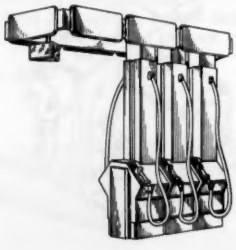
U.S. Cl. D15—7



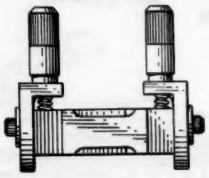
262,114
PORTABLE PUMP
John Rowlands, London, Canada, assignor to Pressure Equipment Limited, London, Canada
Filed May 31, 1979, Ser. No. 44,321
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—7



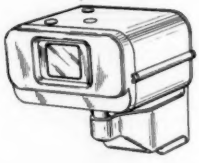
262,115
TRIPLE GASOLINE PUMP
David C. Rowan, and Armin E. Mittermaier, both of Fort Wayne, Ind., assignors to Tokheim Corporation, Fort Wayne, Ind.
Filed May 29, 1979, Ser. No. 43,436
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—9.2



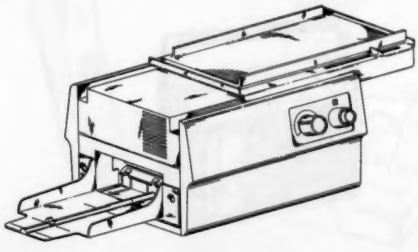
262,116
CONTACT ARM UNIT FOR A BELT GRINDING MACHINE
Elwin H. Fleckenstein, Alden, N.Y., assignor to Dynabrade, Inc., Tonawanda, N.Y.
Continuation-in-part of Ser. No. 924,994, Jul. 17, 1978, Pat. No. Des. 254,789. This application Nov. 23, 1979, Ser. No. 96,766
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—126



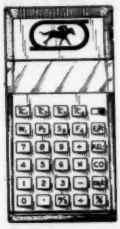
262,117
SURVEILLANCE CAMERA
Kiyohiko Sasaki, Tokyo, Japan, assignor to Yashica Co., Ltd., Tokyo, Japan
Filed Aug. 8, 1979, Ser. No. 64,706
Claims priority, application Japan, Mar. 9, 1979, 54-8980
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—2



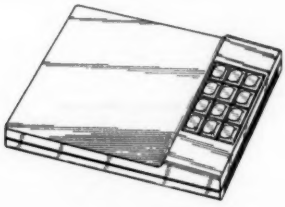
262,118
DOCUMENT COPIER
Hans J. Sinn, Fairfield, and Denis C. Weil, Wilton, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.
Filed Jun. 11, 1979, Ser. No. 47,616
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—31



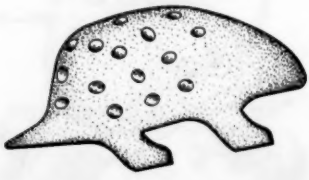
262,119
HAND HELD CALCULATOR
Armond F. Cannella, North Syracuse, N.Y., assignor to Cannella Corporation, North Syracuse, N.Y.
Filed Jun. 18, 1979, Ser. No. 49,275
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D18—7



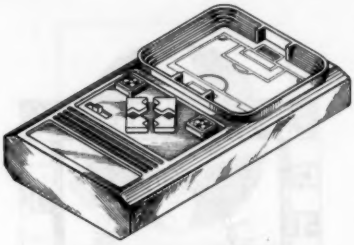
262,120
MEMORANDUM REGISTER
Hans Halm, Herne, Fed. Rep. of Germany, assignor to Confon Ag, Gallen, Switzerland
Filed Apr. 10, 1979, Ser. No. 28,701
The portion of the term of this patent subsequent to Jul. 24, 1993, has been disclaimed.
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—76



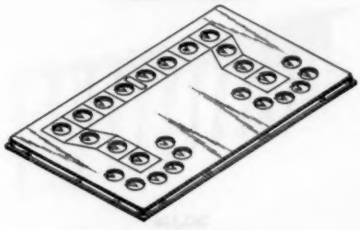
262,121
HOLDER FOR CRAYONS AND PENCILS
Hugh F. Brady, 215 Anderson Pl., Buffalo, N.Y. 14222
Filed Mar. 10, 1980, Ser. No. 128,443
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—82



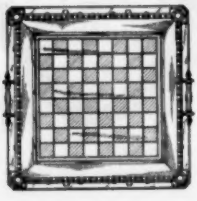
262,122
SOCCER GAME DISPLAY AND CONTROL PANEL OR SIMILAR ARTICLE
Robert B. Lovejoy, Torrance, Calif., assignor to Mattel, Inc., Hawthorne, Calif.
Filed Oct. 16, 1978, Ser. No. 951,897
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—13



262,123
GAME BOARD
Yi Chen, 23356 Batey Ave., Harbor City, Calif. 90710
Filed Jan. 21, 1980, Ser. No. 113,521
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—20

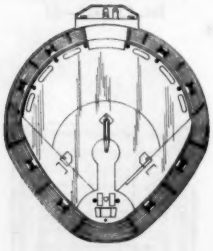


262,124
GAME CABINET
Harrison W. Sholl, 151 Liberty Ave., Babylon, N.Y. 11703
Filed Jan. 4, 1979, Ser. No. 721
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—24

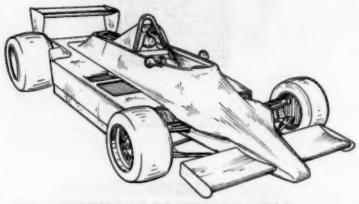


262,125
GAME BOARD
Robert W. Carroll, Cleveland Heights, and Robert A. Kaplan, University Heights, both of Ohio, assignors to Kapcar Productions, Inc., Mayfield Village, Ohio
Filed Jan. 18, 1980, Ser. No. 113,359
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—25

262,126
BASEBALL GAME BOARD
Mitsuo Tsukuda, No. 1-3, 3-chome, Moto-Asakusa, Taito-ku, Tokyo, Japan
Filed Jan. 3, 1978, Ser. No. 866,608
Claims priority, application Japan, Sep. 16, 1977, 52-35670
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—28



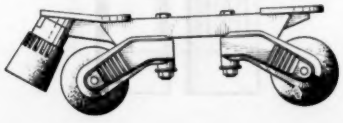
262,127
MODEL RACING CAR
Maurice P. Phillippe, Woking, England, assignor to Tyrrell Racing Organisation Limited, Surrey, England
Filed May 25, 1979, Ser. No. 42,579
Claims priority, application United Kingdom, Dec. 15, 1978, 987692/78
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—137



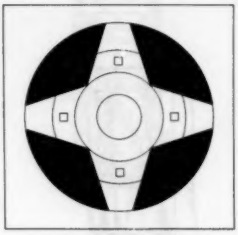
262,128
TOY ELEPHANT
Richard W. M. Kimbrough, Lancaster, Pa., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Jan. 28, 1980, Ser. No. 115,892
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—162

262,129
PHYSICAL EXERCISER
Gert F. Kölbel, Hanover, and Werner Geisselbrecht, Meitze, both of Fed. Rep. of Germany, assignors to Compret N.V., Amsterdam, Netherlands
Filed Mar. 23, 1979, Ser. No. 23,500
Claims priority, application United Kingdom, Sep. 25, 1978, 986495/78
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D21—191

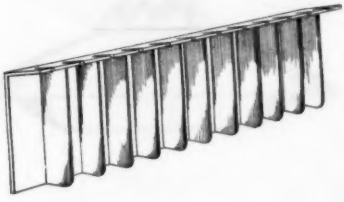
262,130
ROLLER SKATE
Koichi Yoshimoto, Kobe, Japan, assignor to Hanshin Sogyo Co., Ltd., Osaka, Japan
Filed Jan. 28, 1980, Ser. No. 115,721
Claims priority, application Japan, Aug. 2, 1979, 54-32535
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D21—226



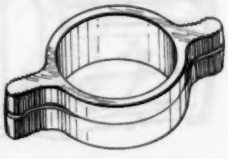
262,131
GUN TARGET
Charles R. Dulude, 33 Burnside Ave., East Hartford, Conn. 06108
Filed Apr. 7, 1978, Ser. No. 894,641
Term of patent 14 years
Int. Cl. D22—*04*
U.S. Cl. D22—15



262,132
FISHING LURE STORAGE DEVICE
John O. McHugh, 14901 Grandmont, Detroit, Mich. 48227
Filed May 19, 1980, Ser. No. 151,351
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—99

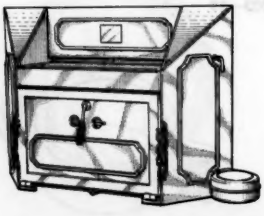


262,133
COLLAR FOR HOSE COUPLINGS AND THE LIKE
Jonathan D. Fain, Providence, R.I., assignor to Teknor Apex Company, Pawtucket, R.I.
Filed Apr. 16, 1979, Ser. No. 30,335
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—44



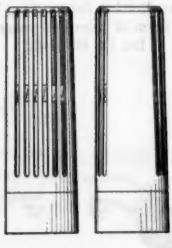
262,134
COMBINED LAVATORY AND BATHROOM CABINET
James Perkins, Box 635, Sanbornville, N.H. 03872
Filed Aug. 20, 1980, Ser. No. 179,722
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—59

262,135
FIREPLACE INSERT STRUCTURE
David K. Halls, 296 E. 300 North, Manti, Utah 84642
Filed May 21, 1979, Ser. No. 40,767
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—94

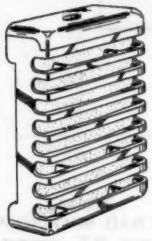


262,136
AIR FRESHENER
Leon Patrigot, 3-5-7, Rue Magnaval, Lyon 69001, France
Filed Aug. 7, 1979, Ser. No. 64,998
Claims priority, application France, Feb. 21, 1979, 3098
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150

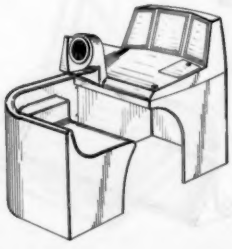
262,137
HOUSING FOR DISPENSING AIR TREATING MATERIAL
Earl Hoyt, Franklin Lakes, N.J., assignor to Airwick Industries, Inc., Carlstadt, N.J.
Filed Sep. 7, 1979, Ser. No. 73,420
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150



262,138
DISPENSER FOR AIR FRESHENING MATERIAL
Jacques Bousgarbies, and Yves Joyaux, both of Poitiers, France, assignors to Airwick Industries, Inc., Carlstadt, N.J.
Filed Dec. 3, 1979, Ser. No. 99,455
Claims priority, application Switzerland, Jun. 8, 1979, 110535
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150

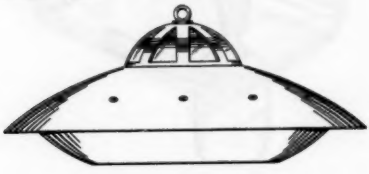


262,139
BLOOD PRESSURE MEDICAL MEASUREMENT APPARATUS
Stacey Duckat, Miraleste, Calif., assignor to National Blood Pressure Services, Inc., Irvine, Calif.
Filed Feb. 28, 1979, Ser. No. 16,089
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—1.1



262,140
ELECTRONIC CALCULATING MACHINE
Masafumi Yamagami, and Shigeru Kurozumi, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Oct. 11, 1979, Ser. No. 83,846
Claims priority, application Japan, Apr. 12, 1979, 54-15205
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D18—7

262,141
LAMP SHADE
Lucien C. Jones, 8201 NW. 38th Ter., Oklahoma City, Okla. 73008
Filed Feb. 5, 1979, Ser. No. 9,331
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D26—131



262,142
PIPE
S. Franklin Sher, 609 Lochmoor, Danville, Calif. 94526
Filed Jun. 2, 1980, Ser. No. 156,313
Term of patent 14 years
Int. Cl. D27—*02*
U.S. Cl. D27—03

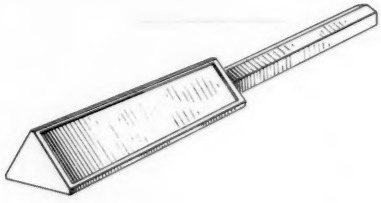
262,143
PIPE
S. Franklin Sher, 609 Lochmoor, Danville, Calif. 94526
Filed Jun. 2, 1980, Ser. No. 156,315
Term of patent 14 years
Int. Cl. D27—*02*
U.S. Cl. D27—3

262,144
PIPE
S. Franklin Sher, 609 Lochmoor, Danville, Calif. 94526
Filed Jun. 2, 1980, Ser. No. 156,316
Term of patent 14 years
Int. Cl. D27—*02*
U.S. Cl. D27—03

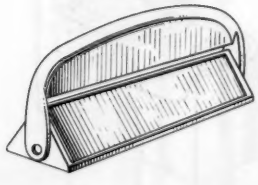
262,145
PIPE
S. Franklin Sher, 609 Lochmoor, Danville, Calif. 94526
Filed Jun. 2, 1980, Ser. No. 156,317
Term of patent 14 years
Int. Cl. D27—*02*
U.S. Cl. D27—03

262,146
PORTABLE PIPE RACK
Gary E. Reavis, 11040 Francisco Pl., Riverside, Calif. 92505
Filed Aug. 2, 1978, Ser. No. 930,587
Term of patent 14 years
Int. Cl. D27—*99*
U.S. Cl. D27—06

262,147
FINGER NAIL BUFFING WAND
Morris Sussman, Freeport, N.Y., assignor to Shore Plastics, Inc., Freeport, N.Y.
Filed Apr. 7, 1980, Ser. No. 137,999
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—59

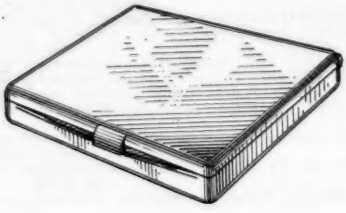


262,148
SELECTIVE FINGER NAIL BUFFER
Morris Sussman, Freeport, N.Y., assignor to Shore Plastics, Inc., Freeport, N.Y.
Filed Apr. 7, 1980, Ser. No. 138,000
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—59

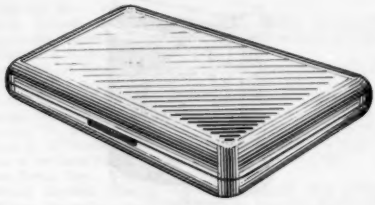


262,149
CONTAINER FOR FINGERNAIL POLISH AND REMOVER
Julie M. Plaut, Kaal Rock Manor, Apt. 2J, Poughkeepsie, N.Y. 12601
Filed Mar. 25, 1980, Ser. No. 133,846
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—77

262,150
COSMETIC COMPACT
Morris Sussman, Freeport, N.Y., assignor to Shore Plastics, Inc., Freeport, N.Y.
Filed Jun. 25, 1980, Ser. No. 162,798
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—83



262,151
COMPACT FOR COSMETICS
Morris Sussman, Freeport, N.Y., assignor to Shore Plastics, Inc., Freeport, N.Y.
Filed Jun. 25, 1980, Ser. No. 162,800
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—83



262,152
LIPSTICK CASE OR SIMILAR ARTICLE
Thomas F. Holloway, Southbury, Conn., assignor to Risdon Corporation, Naugatuck, Conn.
Filed Jun. 30, 1980, Ser. No. 164,261
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—85

262,153

**BIRD CAGE**

Charles O. Fuerst, Simi Valley, Calif., assignor to Aquaria, Inc., Van Nuys, Calif.

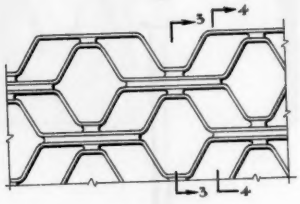
Filed Sep. 13, 1979, Ser. No. 75,130
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—4

262,154

**EXPANDED PANEL OF EXTRUDED METAL**

William L. Jury, Royal Park, Australia, assignor to John McIlwraith Industries Ltd., Royal Park, Australia

Filed Mar. 28, 1980, Ser. No. 134,792
Claims priority, application Australia, Oct. 2, 1979, 79141
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D92—26



# LIST OF PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 1ST DAY OF DECEMBER, 1981

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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ABC Packaging Machine Corporation: *See*—
Reichert, Donald G., 4,303,405, Cl. 493-92.000.

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Abernathy, L. Wayne: *See*—
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Adair, Harold L., to Walker-Neer Manufacturing Co., Inc. Self-centering clamp. 4,303,270, Cl. 294-88.000.

Adair, Robin W. High temperature protective mitt. 4,302,851, Cl. 2-158.000.

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Adams, Paul G.; and Gebler, Kenneth A., to Nalco Chemical Company. Sprayable material for repairing base plates of ingot molds. 4,303,700, Cl. 427-135.000.

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Adler, Alan J. Climbing toy. 4,302,902, Cl. 46-132.000.

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Lucian, Anton; Zwiener, Rudolf; and Roehrich, Siegfried, 4,303,107, Cl. 139-450.000.

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Armand, Michel B.; and Duclot, Michel, 4,303,748, Cl. 429-192.000.

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Kobubu, Akio; and Tanaka, Toshio, 4,303,956, Cl. 360-123.000.
Moro, Tadao; Sakamoto, Hiroshi; Yamamoto, Mitsuru; Kokubo, Toshimitsu; and Masuda, Kaoru, 4,303,526, Cl. 210-512.300.

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Hell, August; and Cocron, Istvan, 4,303,319, Cl. 354-25.000.

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Matsuoka, Yoshitaka; Shimazoe, Michitaka; Yamamoto, Yoshimi; Ai, Mitsuo; Miyauchi, Keiji; Nemoto, Hideyuki; Tsuchiya, Masatoshi; and Tanabe, Masanori, 4,303,903, Cl. 338-4.000.

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Ohira, Toshiaki; Miyano, Reiko; and Yoshida, Ryonosuke, 4,303,452, Cl. 127-32.000.
Takezawa, Kenji; and Hiratani, Hajime, 4,303,650, Cl. 424-177.000.
Tanekawa, Tetsuo; Takashima, Hiroshi; and Hachiya, Tomoyoshi, 4,303,680, Cl. 426-60.000.

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Suzuki, Takashi; Akai, Shin-ichi; Mori, Hideki; Aoyagi, Katsunosuke; Shimoda, Takashi; Matsumoto, Kazuhisa; and Sasaki, Masami, 4,303,464, Cl. 156-605.000.

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Iwasaki, Ryuichi, 4,303,148, Cl. 188-331.000.

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Shimizu, Kenichi; Kamiya, Akihiro; Yamazaki, Shu; Akiyama, Riozo; Makuuchi, Teruji; and Yoshizaki, Shiichiro, 4,303,848, Cl. 313-346.00R.

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Elfving, Goran L.; and Farquhar, George N., 4,302,880, Cl. 30-382.000.

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Jones, Frank W.; and Mielnicki, Joseph, 4,302,997, Cl. 83-425.300.

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Campbell, George T. R.; Ohno, Kosaku; and Kasuga, Toshishige, 4,303,166, Cl. 212-233.000.

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Selas, George J.; and Hart, John S., 4,303,147, Cl. 188-298.000.

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Berke, Herbert; Allen, John H.; and Owen, Joseph R., 4,303,394, Cl. 434-40.000.
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Berke, Herbert; and Allen, John H., 4,303,938, Cl. 358-139.000.

Allen, Robert A.: *See*—
Orfeo, Sabatino R.; Allen, Robert A.; Stiel, Leonard I.; and Pelava, John W., 4,303,536, Cl. 252-67.000.

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Allied Corporation: *See*—
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Stephenson, Robert L., 4,303,209, Cl. 242-107.40A.

Allis-Chalmers Corporation: *See*—
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Alps Electric Co., Ltd.: *See*—
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ALZA Corporation: *See*—
Shell, John W.; and Gale, Robert M., 4,303,637, Cl. 424-14.000.

Amax Inc.: *See*—
Huggins, Dale K.; Beckstead, Leo W.; and Queneau, Paul B., 4,303,622, Cl. 423-55.000.
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American District Telegraph Company: *See*—
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American Hospital Supply Corporation: *See*—
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Anderson, Richard W.; and Schlener, J. Edward, to GTE Products Corporation. Apparatus for monitoring and signalling system. 4,303,801, Cl. 179-5.00R.

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Andersson, Bengt A., to Maskinfabriken Waco AB. Cutting tool. 4,303,113, Cl. 144-230.000.

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Lindahl, Ulf P. F.; Backstrom, Gudrun E.; Thunberg, John Y. L.; Fransson, Lars-Ake; Andersson, Lars-Olov; Holmer, Erik Y.; Sandberg, Inga H.; and Soderstrom, Ewa G., 4,303,651, Cl. 424-183.000.

Andersson, Rickard; and Danerlov, Ove, to Linden-Alimak AB. Structure for damping the oscillation of building cranes. 4,303,164, Cl. 212-146.000.

Ando, Masao, to Chisso Corporation. Shielded skin-effect current heated pipeline. 4,303,826, Cl. 219-301.000.

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Aubel, John A.; Bose, William H.; and Burrows, James H., to Borg-Warner Corporation. Low-differential pressure delay valve. 4,303,095, Cl. 137-493.800.

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Audeh, Costandi A., to Mobil Oil Corporation. 1-Methyl or propyl organic nitrogen compounds and method of preparation. 4,303,791, Cl. 544-351.000.

Audesse, Emery G.; Hartman, Donald W.; and Shaffer, John W., to GTE Products Corporation. Multilamp photoflash unit with protection against electrostatic charges. 4,303,963, Cl. 362-15.000.

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Weindanz, Herbert; and Auf dem Graben, Horst, 4,303,160, Cl. 206-455.000.

Augst, Horst G., to Telefonaktiebolaget L M Ericsson. Crystal filter structure for realizing a ladder filter. 4,303,897, Cl. 333-189.000.

August Ruggelberg, Firma: *See*—
Leistner, Guter, 4,302,911, Cl. 51-334.000.
August, William: *See*—
Raines, Arnold; and August, William, 4,303,196, Cl. 236-88.000.
Austin, George C., Jr. Apparatus to convert Otto cycle engine to diesel engine. 4,303,045, Cl. 123-266.000.
Austung Proprietary Limited: *See*—
Springborn, Karl S., 4,303,416, Cl. 51-293.000.
Autelca AG: *See*—
Siegenthaler, Fritz, 4,303,347, Cl. 400-354.000.
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Burke, John P.; and Young, Alastair J., 4,303,006, Cl. 92-85.00R.
Avery, Robert W. Center pivot irrigation system having a pressure sensitive drive apparatus. 4,303,203, Cl. 239-710.000.
Aziende Colori Nazionali Affini ACNA S.p.A.: *See*—
Marangelli, Ugo; Ciocci, Giancarlo; and Papa, Sisto S., 4,303,407, Cl. 8-643.000.
Azuma, Akiko: *See*—
Ono, Syoji; Sugiyama, Takashi; Kawakami, Yoshiko; Ichikawa, Yataro; Suzuki, Yoji; Ohmori, Hitoshi; and Azuma, Akiko, 4,303,664, Cl. 424-271.000.
B. F. Goodrich Company, The: *See*—
Odar, Joseph, 4,303,769, Cl. 526-93.000.
Babcock Krauss-Maffei Industrieanlagen GmbH: *See*—
Schmidt, Rudiger; and Steininger, Franz, 4,303,477, Cl. 201-2.500.
Babcock & Wilcox Company, The: *See*—
Kaya, Azmi; Keyes, Marion A., IV; and Lukas, Michael P., 4,303,982, Cl. 364-550.000.
Slabinski, Chet J., 4,303,896, Cl. 333-28.00R.
Babson Bros. Co.: *See*—
Thompson, Duncan M.; Swanson, Harold V.; and Coombs, Lawrence J., 4,303,038, Cl. 119-14.360.
Backstrom, Gudrun E.: *See*—
Lindahl, Ulf P. F.; Backstrom, Gudrun E.; Thunberg, John Y. L.; Fransson, Lars-Ake; Andersson, Lars-Olov; Holmer, Erik Y.; Sandberg, Inga H.; and Soderstrom, Ewa G., 4,303,651, Cl. 424-183.000.
Baehr, Arthur: *See*—
Spring, Arthur; and Baehr, Arthur, 4,303,614, Cl. 422-101.000.
Bagdasarov, Khachik S.; Khaimov-Malkov, Valentin Y.; Ilin, Nikolai P.; Starostin, Jury A.; Fedorov, Evgeny A.; and Sedakov, Nikolai I. Method of growing monocrystals of corundum from a melt. 4,303,465, Cl. 156-616.00R.
Baikoff, Eugene M. A. Method and apparatus for compressively separating waste material. 4,303,412, Cl. 44-1.00D.
Baima, Mario: *See*—
Tavoni, Gian Paolo; and Baima, Mario, 4,302,969, Cl. 73-170.00R.
Bair, Puran. Wind powered generator with cyclic airfoil latching. 4,303,835, Cl. 290-55.000.
Baird, William C., Jr.: *See*—
Eberly, Paul E., Jr.; Mauldin, Charles H.; and Baird, William C., Jr., 4,303,500, Cl. 208-139.000.
Baker, Donal E.: *See*—
Stacey, Eric J.; Baker, Donal E.; Doughman, Charles L.; and Jessee, Ralph D., 4,303,972, Cl. 363-10.000.
Baker, James M.: *See*—
Basse, William J.; and Baker, James M., 4,303,346, Cl. 400-342.000.
Baker, Richard H., to Exxon Research & Engineering Co. VMOS/-Bipolar power switch. 4,303,841, Cl. 307-570.000.
Balazs, Endre A. Hyaluronate based compositions and cosmetic formulations containing same. 4,303,676, Cl. 424-359.000.
Ball, Harry N., to Smith International, Inc. Fluid passage formed by diamond insert studs for drag bits. 4,303,136, Cl. 175-329.000.
Ballantyne, Wayne E.: *See*—
DiNovo, Salvatore T.; and Ballantyne, Wayne E., 4,303,469, Cl. 162-30.00R.
Ballou, Edward V.: *See*—
United States of America, National Aeronautics and Space Administration; Wydeven, Theodore; Wood, Peter C.; Ballou, Edward V.; and Spitze, Leroy A., 4,303,961, Cl. 361-230.000.
Banno, Shigeki: *See*—
Nakayama, Masaharu; Matsushima, Masaru; Banno, Shigeki; and Kanazawa, Nobuo, 4,303,762, Cl. 525-299.000.
Bapst, Urs H.; Gfeller, Fritz; and Vettiger, Peter, to International Business Machines Corporation. System for separating an optical signal from ambient light. 4,303,855, Cl. 250-226.000.
Baran, Miroslav, to Bata Shoe Company, Inc. Control circuit for electromagnetic apparatus. 4,303,869, Cl. 318-130.000.
Bard, Allen J.; and Kraeutler, Bernhard, to Board of Regents, University of Texas System. Methods of photocatalytic decarboxylation of saturated carboxylic acid. 4,303,486, Cl. 204-162.00R.
Bardsley, Harold B., to Spencer Wright Industries, Inc. Tufting machine hook module. 4,303,024, Cl. 112-79.00R.
Bardsley, Harold B., to Spencer Wright Industries, Inc. Tufting mechanism for forming low pile. 4,303,025, Cl. 112-79.00R.
Barkley, Keith G.; Ghafghaichi, Majid; Gopalakrishna, Yelandur R.; and Tzou, Albert J., to International Business Machines Corporation. Serial parallel charge coupled device employing a gate splitting device. 4,303,992, Cl. 365-51.000.
Barley, Thomas A.; Rast, Gustaf J., Jr.; and Ashley, James R., to United States of America, Army. Matched high Q, high frequency resonators. 4,303,899, Cl. 333-225.000.
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Hertell, Siegfried; Kirchherr, Claus; and Kahl, Horst, 4,303,091, Cl. 137-117.000.
Barnes, Hugh V., to T.I. Domestic Appliances, Ltd. Flame failure device. 4,303,384, Cl. 431-58.000.
Baron, Arthur L.; and Sivaramakrishnan, Parameswar, to Mobay Chemical Corporation. Bis(4-hydroxyphenyl sulfonylphenyl) bisphenyl disulfones and useful resins based thereon. 4,303,776, Cl. 528-171.000.
Barr, Gaitskill S.: *See*—
Nixon, Raymond F.; and Barr, Gaitskill S., 4,303,359, Cl. 409-9.000.
Bartha, Peter; and Tutsek, Alexander, to Refratechnik GmbH. Glass forming compound and brick made therewith. 4,303,449, Cl. 501-128.000.
Baseden, Gerald A., to Du Pont de Nemours, E. I., and Company. Process for improving the adhesion of paint to polyolefin surfaces. 4,303,697, Cl. 427-54.100.
BASF Aktiengesellschaft: *See*—
Cary, Paul D., 4,303,813, Cl. 200-52.00R.
Hack, Joachim, 4,303,951, Cl. 360-46.000.
BASF Wyandotte Corporation: *See*—
Newkirk, David D.; Login, Robert B.; and Thir, Basil, 4,303,767, Cl. 525-444.000.
Basista, Heinrich, to Carl Zeiss-Stiftung. Photographic objective of continuously variable focal length. 4,303,312, Cl. 350-427.000.
Basse, William J.; and Baker, James M., to Sycor, Inc. Printer head clutch. 4,303,346, Cl. 400-342.000.
Bassinger, Grey, to Oncor Corporation. Earth drilling lubricated hydraulic shock absorber and method. 4,303,138, Cl. 175-296.000.
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Baran, Miroslav, 4,303,869, Cl. 318-130.000.
Battelle Development Corporation: *See*—
Ekstrom, Philip A., 4,303,861, Cl. 250-370.000.
Battis, Robert. Automobile air filter having replaceable and readily disposable filter element. 4,303,426, Cl. 55-498.000.
Bauer, Gunther; Burghardt, Wolfgang; and Moller, Hilmar, to Hoechst Aktiengesellschaft. Hairy monocomponent yarn. 4,302,929, Cl. 57-247.000.
Baxa Corporation: *See*—
Smith, Philip E., 4,303,071, Cl. 128-272.300.
Baxi, Chandrakant B., to General Atomic Company. Nuclear reactor core assembly. 4,303,474, Cl. 376-175.000.
Baxter Travenol Laboratories, Inc.: *See*—
Cullis, Herbert M., 4,303,336, Cl. 356-39.000.
Grimm, Daniel J.; Unger, John M.; and Virag, Robert A., 4,303,601, Cl. 261-142.000.
Siekmann, Rem, 4,303,376, Cl. 417-360.000.
Bayer Aktiengesellschaft: *See*—
Frank, Walter; Bendszus, Otto; Freier, Hansjoachim; and Traenckner, Hans-Joachim, 4,303,567, Cl. 260-29.2UA.
Ganster, Otto; Meiners, Hans J.; Eifler, Willi; Meyborg, Holger; and Schwindt, Jurgen, 4,303,773, Cl. 528-64.000.
Idel, Karsten; and Merten, Josef, 4,303,781, Cl. 528-388.000.
Musch, Rudiger; Schubart, Rudiger; Gobel, Wilhelm; and Pampus, Gottfried, 4,303,765, Cl. 525-343.000.
Nachtkamp, Klaus; Pedain, Josef; and Noll, Klaus, 4,303,774, Cl. 528-71.000.
Bayerische Motoren Werke Aktiengesellschaft: *See*—
Kloth, Wolfgang, 4,303,184, Cl. 224-32.00R.
BBC Brown, Boveri & Company, Limited: *See*—
Gallasch, Hubert, 4,303,220, Cl. 248-679.000.
Beaird-Poulan Division Emerson Electric Co.: *See*—
Murray, Billy W., 4,302,879, Cl. 30-382.000.
Beard, Eugene R. Lock for horizontal sliding window. 4,303,265, Cl. 292-145.000.
Beasley, Marvin L., to RESDEV, Inc. Unsaturated ethylene polymers and processes for preparing and for using same. 4,303,763, Cl. 525-313.000.
Becher, David Z.; Christenson, Roger M.; Coalson, Richard L.; Pierce, Percy E.; and Schimmel, Karl F., to PPG Industries, Inc. Pigment dispersants for coating compositions. 4,303,764, Cl. 525-327.000.
Becker, Willi; and Wirz, Arno, to Heidelberger Druckmaschinen Aktiengesellschaft. Storage cylinder. 4,303,014, Cl. 101-409.000.
Beckmann, Rolf; and Knackstedt, Wilhelm, to Dynamit Nobel AG. Process of the production of composite safety glass. 4,303,739, Cl. 428-429.000.
Beckstead, Leo W.: *See*—
Huggins, Dale K.; Beckstead, Leo W.; and Queneau, Paul B., 4,303,622, Cl. 423-55.000.
Huggins, Dale K.; Queneau, Paul B.; Ziegler, Robert C.; Beckstead, Leo W.; and Hogsett, Robert F., 4,303,623, Cl. 423-55.000.
Beecham Group Limited: *See*—
Goudie, Alexander C., 4,303,674, Cl. 424-331.000.
Harbridge, John B., 4,303,665, Cl. 424-272.000.
Shean, David H. S.; and Steel, John R., 4,303,582, Cl. 260-239.100.
Sime, John T.; and Ainsworth, Anthony T., 4,303,656, Cl. 424-248.400.
Beguwala, Moiz M.: *See*—
Splinter, Michael R.; Palys, Richard F.; and Beguwala, Moiz M., 4,303,455, Cl. 148-1.500.
Behrmann, Alfred; Gottschlich, Herbert; Koch, Christian; and Abel, Otto, to Kraftwerk Union Aktiengesellschaft. Recovery of liquid and gaseous hydrocarbons from raw materials containing hydrocarbons such as oil shale and coal. 4,303,495, Cl. 208-8.0LE.
Bell & Howell Company: *See*—
Plum, Dale, 4,303,234, Cl. 271-109.000.
Bell, Oliver A., Jr.; Gilleland, Randall C.; and Chance, Davey J., to Colt Industries Operating Corp. Gap condition sensing circuit for

electrical discharge machining power supply. 4,303,957, Cl. 361-88.000.

Bell, Stanley C., to American Home Products Corporation. Benzyl-tetrahydro-2,4-dihydroxy-1,6-naphthyridine-3 carboxylic acid type antiallergy agents. 4,303,661, Cl. 424-256.000.

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Bjorkholm, John E.; Freeman, Richard R.; Panock, Richard L.; and Cooke, William E., 4,303,840, Cl. 307-427.000.
D'Angelo, Ralph, 4,302,982, Cl. 74-89.150.
El Hamamsy, Mahmoud A., 4,303,831, Cl. 250-551.000.
Kapadia, Uday S.; and Logioco, John W., 4,303,812, Cl. 200-6.00R.
Patel, Chandra K. N.; and Tam, Andrew C., 4,303,343, Cl. 356-432.000.

Bell, William W., to Carrier Corporation. Method for defrosting a refrigeration system. 4,302,945, Cl. 62-81.000.

Bellos, Thomas J., to Petrolite Corporation. Ureylenes and uses thereof. 4,303,780, Cl. 528-367.000.

Beloit Corporation: *See—*
Karr, Gerald W., 4,303,462, Cl. 156-538.000.

Benckiser-Knapsack GmbH: *See—*
Waegerle, Rolf R., 4,303,546, Cl. 252-180.000.

Benckiser-Knapsack GmbH Ladenburg: *See—*
Wasel-Nielen, Joachim; Merkenich, Karl; Gehrig, Oskar, deceased; and Sommer, Klaus, 4,303,541, Cl. 252-70.000.

Bender, Joseph M., to Pascal & Associates. Method for applying therapeutic heat. 4,303,074, Cl. 128-399.000.

Bender, Ulrich, to Emil Bender, Firma. Expanded-metal grid. 4,303,747, Cl. 429-161.000.

Bendix Corporation, The: *See—*
Gaiser, Robert F., 4,303,146, Cl. 188-71.800.
Gallusser, David O.; Hemmer, Valentine J.; Toombs, Gary C.; and Brush, Robert W., 4,303,221, Cl. 249-102.000.

Bendoraitis, Joseph G.: *See—*
McHale, William D.; and Bendoraitis, Joseph G., 4,303,782, Cl. 528-416.000.

Bendszus, Otto: *See—*
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Benoit, Lloyd F. Directional drilling sub. 4,303,135, Cl. 175-73.000.

Bentvelzen, Jozef M.: *See—*
Meredith, Michael D.; Bentvelzen, Jozef M.; and Bepple, Henry, 4,303,470, Cl. 162-57.000.

Bentzen, Bruce D.: *See—*
Shah, Suresh T.; Huffstutler, Miles C., Jr.; and Bentzen, Bruce D., 4,303,530, Cl. 210-651.000.

Benveniste, Victor M.: *See—*
Bjorkholm, Paul J.; and Benveniste, Victor M., 4,303,860, Cl. 250-363.00S.

Bepple, Henry: *See—*
Meredith, Michael D.; Bentvelzen, Jozef M.; and Bepple, Henry, 4,303,470, Cl. 162-57.000.

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Berger, Jean L.; and Coutures, Jean L., to Thomson CSF. Process for filtering an electrical signal by charge transfer into a semiconductor and switch capacitor filter using such a process. 4,303,839, Cl. 307-304.000.

Berggren, Tony, to Ifo Sanitar Aktiebolag Simrishamnsfabriken. Children's highchair equipped with play and food tray. 4,303,272, Cl. 297-153.000.

Berke, Herbert; Allen, John H.; and Owen, Joseph R., to United States of America, Navy. Computer generated image simulator. 4,303,394, Cl. 434-40.000.

Berke, Herbert; Allen, John H.; and Owen, Joseph R., to United States of America, Navy. Sawtooth waveform generating circuit for utilization in a helmet mounted display. 4,303,868, Cl. 315-364.000.

Berke, Herbert; and Allen, John H., to United States of America, Navy. Pattern generator for simulating image generation. 4,303,938, Cl. 358-139.000.

Berman, Charles. Multiple pocket clothing accessory. 4,303,187, Cl. 224-222.000.

Berol Kemi AB: *See—*
Laursen, Bente L., 4,303,471, Cl. 162-158.000.

Berry, Eddie T., to Morgan Actuators, Inc. Nutating motor current control. 4,303,871, Cl. 318-138.000.

Berry, Mac L. Video stand and method of exhibiting informational programs. 4,303,946, Cl. 358-254.000.

Bersin, Richard L.: *See—*
Scornavacca, Frank; and Bersin, Richard L., 4,303,467, Cl. 156-643.000.

Beske, Grant A.; Cohen, Abraham B.; and Uhler, Roger O., to Du Pont de Nemours, E. I., and Company. Use of prolonged tack toners for the preparation of electric circuits. 4,303,698, Cl. 427-96.000.

Betz Laboratories, Inc.: *See—*
May, Roger C.; and Geiger, Gary E., 4,303,568, Cl. 260-29.6MP.

Betzing, Hans: *See—*
Biedermann, Jurgen; Wendel, Armin; Betzing, Hans; and Neuser, Volker, 4,303,673, Cl. 424-324.000.

Bianchi, Nereo, to Necchi Societa per Azioni. Rotary hook for sewing machine. 4,303,029, Cl. 112-231.000.

Biedermann, Jurgen; Wendel, Armin; Betzing, Hans; and Neuser, Volker, to A. Nattermann & Cie. GmbH. N-Propionylsarcosineanilides, process for their preparation, and pharmaceutical compositions containing them. 4,303,673, Cl. 424-324.000.

Biesinger, Mark G.: *See—*
Stensel, H. David; Maier, Peter; Biesinger, Mark G.; Refling, David R.; Klepper, Ronald P.; and Maxham, John V., 4,303,516, Cl. 210-195.400.

Binasik, Chester S.: *See—*
Voorheis, Temple S.; Vosper, Ralph R.; Binasik, Chester S.; and Harthun, Norman, 4,303,386, Cl. 431-177.000.

Bing, David H.: *See—*
Laura, Richard; and Bing, David H., 4,303,592, Cl. 260-543.00F.

Binsley, David L.: *See—*
Kinsey, Richard R.; Halbritter, George W.; Binsley, David L.; Rasmussen, Allan E.; and Totten, Howard Q., 4,303,898, Cl. 333-114.000.

Binzer, Rollin: *See—*
Stone, S. Gerald; Emerson, Robert M.; and Binzer, Rollin, 4,303,159, Cl. 206-387.000.

Biscayne Decorative Products, Inc.: *See—*
McCann, Thomas J.; and Regan, Ernest E., 4,303,695, Cl. 427-44.000.

Bitter, Charles R., Jr.; and Hafer, Terry D., to Motorola Inc. Probe loop feed for transverse edge waveguide slot radiator. 4,303,923, Cl. 343-771.000.

Bjorkholm, John E.; Freeman, Richard R.; Panock, Richard L.; and Cooke, William E., to Bell Telephone Laboratories, Incorporated. Single beam second harmonic generation in isotropic media. 4,303,840, Cl. 307-427.000.

Bjorkholm, Paul J.; and Benveniste, Victor M., to American Science and Engineering, Inc. High resolution radiation detector. 4,303,860, Cl. 250-363.00S.

Black, Paul F.: *See—*
Smart, David C.; and Black, Paul F., 4,303,297, Cl. 339-218.00M.

Black, Robert A.; and Peterson, Gary A., to Honeywell Inc. Condition control system with safety feedback means. 4,303,383, Cl. 431-31.000.

Blanck, Thomas W., to International Business Machines Corporation. Air purging pump for ink jet printers. 4,303,929, Cl. 346-140.00R.

Blankenhorn, David H. Dietary aid for accumulating machine readable information. 4,303,854, Cl. 235-492.000.

Blatt, Jerrold R.: *See—*
Wynosky, Thomas A.; Eiler, Donald C.; and Blatt, Jerrold R., 4,302,934, Cl. 60-262.000.

BLD Products, Ltd.: *See—*
Neighbor, Larry A., 4,303,598, Cl. 261-39.00B.

Bleloch, William. Apparatus for the production of steel and iron alloys. 4,303,230, Cl. 266-270.000.

Blevins, Theodore R., to Chevron Research Company. Arrangement of wells for producing subsurface viscous petroleum. 4,303,126, Cl. 166-245.000.

Blount, David H. Process for the Production of alkall metal silicate-organic plastics. 4,303,768, Cl. 525-479.000.

BOA Drilling Equipment, Inc.: *See—*
Bonca, Aaron, 4,303,130, Cl. 173-23.000.

Board of Regents, University of Texas System: *See—*
Bard, Allen J.; and Kraeutler, Bernhard, 4,303,486, Cl. 204-162.00R.

Boden, Richard M.; Dekker, Lambert; Schmitt, Frederick L.; and Van Loveren, Augustinus G., to International Flavors & Fragrances Inc. Use of mixture of aliphatic $C_{10}$ branched olefins in augmenting or enhancing the aroma of perfumes, and/or perfumed articles. 4,303,555, Cl. 252-522.00R.

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Glaser, Horst; and Tamm, Rolf, 4,303,339, Cl. 356-244.000.

Boegli, Serge; and Lebet, Jean-Pierre, to F. J. Burrus; and Cie and Baumgartner Papier S. A. Method for producing filter cigarettes. 4,303,080, Cl. 131-202.000.

Boeing Company, The: *See—*
Bolender, John W.; and Simmons, Gerald C., 4,303,213, Cl. 244-137.00R.
Shaw, Jack C.; Gilbert, John F.; Olbrechts, Guy R.; and McIntyre, Melville D., 4,303,978, Cl. 364-453.000.

Bois, Daniel. Method and device of deposition through vacuum evaporation making use of a modulated electron beam and a screen. 4,303,694, Cl. 427-42.000.

Boise Cascade Corporation: *See—*
Ditto, Peter J.; Ellerbrock, Donald H.; and Pelton, Peter G., 4,303,190, Cl. 229-5.600.

Boldt, Robert T., to Dickey-john Corporation. Rotary steam dryer control. 4,302,888, Cl. 34-48.000.

Bolender, John W.; and Simmons, Gerald C., to Boeing Company, The. Tow plate. 4,303,213, Cl. 244-137.00R.

Bolte, Steven B.: *See—*
Gruber, Robert J.; and Bolte, Steven B., 4,303,749, Cl. 430-39.000.

Bonca, Aaron, to BOA Drilling Equipment, Inc. All terrain drill unit. 4,303,130, Cl. 173-23.000.

Bonforte, Anthony G. Cutting blade. 4,302,878, Cl. 30-347.000.

Bonnerot, Georges; Senn, Patrice; and Coudreuse, Michel, to Telecommunications Radioelectriques et Telephoniques T.R.T. Device for supervising a transmultiplexer. 4,304,000, Cl. 370-70.000.

Boonstra, Alexander H.; and Mutsaers, Cornelis A. H. A., to U.S. Philips Corporation. Resistance material. 4,303,742, Cl. 428-697.000.

Borg-Warner Corporation: *See—*
Aubel, John A.; Bose, William H.; and Burrows, James H., 4,303,095, Cl. 137-493.800.
Fall, Don R.; and Lamarche, Paul E., 4,302,951, Cl. 64-27.00C.

LaCourse, William C.; and Clark, Terence J., 4,303,446, Cl. 501-35.000.
Lech, Thaddeus, Jr., 4,303,149, Cl. 192-70.190.
Bosch-Siemens Hausgerate GmbH: *See—*
Klement, Johann; and Schnabel, Werner, 4,303,817, Cl. 219-10.55D.
Bose, William H.: *See—*
Aubel, John A.; Bose, William H.; and Burrows, James H., 4,303,095, Cl. 137-493.800.
Bosenberg, Wolfram A.: *See—*
Kleinknecht, Hans P.; and Bosenberg, Wolfram A., 4,303,341, Cl. 356-384.000.
Bosland, James M. Compass hood. 4,303,172, Cl. 220-252.000.
Bott, John A. License plate frame assembly. 4,302,896, Cl. 40-209.000.
Bott, John A. Automobile shopping bag container. 4,303,367, Cl. 414-522.000.
Bouery, Roger: *See—*
Moryl, Richard; and Bouery, Roger, 4,303,361, Cl. 411-108.000.
Boulton, Gale E. Insulated carrying container for beverage containers. 4,303,153, Cl. 206-45.310.
Bourlet, Maurice V., to Fabrique Nationale Herstal, en abrege F.N. Pre-fragmented explosive shell. 4,303,015, Cl. 102-492.000.
Bourlier, Claude P.; and Sallot, Louis E. Money passing device in particular for banks, stations or departmental stores. 4,303,021, Cl. 109-19.000.
Bower, James C. Emergency audible instruction apparatus for a fire extinguisher. 4,303,395, Cl. 434-226.000.
Boylan, Francis J., to Drew Chemical Corporation. Liquid defoamer and defoaming process. 4,303,549, Cl. 252-321.000.
Braatz, Robert E., to Airco, Inc. Anesthesia machine with modular flowmeters. 4,302,980, Cl. 73-861.550.
Brack, Karl, to Design Cote Corp. Radiation curing of prepolymer coating compositions. 4,303,696, Cl. 427-44.000.
Braddy, Bruce T., to General Electric Company. Film cooled airfoil body. 4,303,374, Cl. 416-97.00R.
Bradley, Robert W.; and Anderson, Vyron E., to Kwik-Way Manufacturing Company. Engine boring fixture. 4,302,882, Cl. 33-180.00B.
Brammer, Keith W.; and Shaw, John R., to Pfizer Inc. Schistosomicidal compositions. 4,303,659, Cl. 424-250.000.
Branson International Plasma Corporation: *See—*
Scornavacca, Frank; and Bersin, Richard L., 4,303,467, Cl. 156-643.000.
Brashear, Foster M.: *See—*
Shoemaker, Stephen P., Jr.; and Brashear, Foster M., 4,303,248, Cl. 273-356.000.
Braun, Ernst: *See—*
Braun, Gert; and Braun, Ernst, 4,303,276, Cl. 299-43.000.
Braun, Gert; and Braun, Ernst, to Halbach & Braun. Conveyor chute for chain scraper conveyors. 4,303,276, Cl. 299-43.000.
Bridgestone Tire Company Limited: *See—*
Ohnishi, Hiroshi; Fukuyama, Hiroshi; and Yokota, Yasushi, 4,302,966, Cl. 73-66.000.
Yukuta, Toshio; Yagura, Kazuo; and Fuchigami, Nobuhisa, 4,303,755, Cl. 521-52.000.
British-American Tobacco Company Limited: *See—*
Foster, Norman; and Elson, Raymond A., 4,303,191, Cl. 229-44.0CB.
British Gas Corporation: *See—*
Bull, Reginald B., 4,302,976, Cl. 73-639.000.
Brockett, Charles V. Golf swing teaching aid. 4,303,245, Cl. 273-185.00R.
Brouse, S. Bernard; and Wiedel, John. Fastener plunging apparatus. 4,302,991, Cl. 81-429.000.
Brown, Boveri & Cie Aktiengesellschaft: *See—*
Meinhold, Henner, 4,303,877, Cl. 320-6.000.
Brownlow, James M., to International Business Machines Corporation. Luminescent material. 4,303,547, Cl. 252-301.40F.
Brulin, Laurence: *See—*
Covell, John; and Brulin, Laurence, 4,302,890, Cl. 36-7.600.
Brush, Robert W.: *See—*
Gallusser, David O.; Hemmer, Valentine J.; Toombs, Gary C.; and Brush, Robert W., 4,303,221, Cl. 249-102.000.
Bryson, John D., to Vaportek, Inc. Atmospheric control apparatus. 4,303,617, Cl. 422-123.000.
Buchanan, Relva C.; DeFord, H. Dale; and Sircar, Anup, to University of Illinois Foundation. Low temperature densification of zirconia ceramics. 4,303,447, Cl. 501-103.000.
Buchi Laboratoriums-Technik AG: *See—*
Spring, Arthur; and Baehr, Arthur, 4,303,614, Cl. 422-101.000.
Buckbee-Mears Company: *See—*
Thoms, Roland, 4,303,466, Cl. 156-626.000.
Torgersen, Daniel L.; and Fischer, Leon H., 4,303,701, Cl. 427-145.000.
Buettner, Ralf, heir: *See—*
Wasel-Nielen, Joachim; Merkenich, Karl; Gehrig, Oskar, deceased; and Sommer, Klaus, 4,303,541, Cl. 252-70.000.
Buffa, Michael J. Oral hygiene device. 4,303,064, Cl. 128-62.00A.
Buhne, Joachim; Schafer, Rolf; and Stoffel, Axel, to International Business Machines Corporation. Apparatus and method for selective electrochemical etching. 4,303,482, Cl. 204-129.300.
Bull, Reginald B., to British Gas Corporation. Wheel probes. 4,302,976, Cl. 73-639.000.
Bullard, Edward M.; and Smith, Gregory M., to Mobil Oil Corporation. Coextruded multi-layer polyethylene film and bag construction. 4,303,710, Cl. 428-35.000.
Bulle, Wolfgang; and Tilgner, Hans G., to Akzona Incorporated. Filament with conductive layers. 4,303,733, Cl. 428-367.000.
Bullock, Raymond, Jr.; Rick, Christian E.; and Schurr, George A., to Du Pont de Nemours, E. I., and Company. Flowability of rutile pigment. 4,303,702, Cl. 427-220.000.
Bunker Ramo Corporation: *See—*
Spaulding, Tedford H., 4,303,296, Cl. 339-122.00R.
Bunn-O-Matic Corporation: *See—*
Stover, Kenneth W., 4,303,525, Cl. 210-455.000.
Burghardt, Wolfgang: *See—*
Bauer, Gunther; Burghardt, Wolfgang; and Moller, Hilmar, 4,302,929, Cl. 57-247.000.
Burke, John P.; and Young, Alastair J., to Automotive Products Limited. Rolling diaphragm apparatus. 4,303,006, Cl. 92-85.00R.
Burke, Richard E.; and Harris, Edward H., to Hudson Wire Company. Enameled wire oven. 4,303,387, Cl. 432-72.000.
Burns, Robert H., to United States of America, Navy. Method of suppressing radiation from ship stack gases. 4,303,035, Cl. 114-187.000.
Burr-Brown Research Corp.: *See—*
Stitt, Robert M., 4,303,934, Cl. 357-14.000.
Burroughs Corporation: *See—*
Stafford, Irvin G.; and Seitz, Charles L., 4,303,912, Cl. 340-703.000.
Burroughs, Wayne A. Sports vision training device. 4,303,241, Cl. 273-26.00C.
Burroughs Wellcome Co.: *See—*
Morrison, Robert W., Jr.; Mallory, William R.; and Styles, Virgil L., 4,303,789, Cl. 544-323.000.
Morrison, Robert W., Jr.; Mallory, William R.; and Styles, Virgil L., 4,303,790, Cl. 544-323.000.
Burrows, James H.: *See—*
Aubel, John A.; Bose, William H.; and Burrows, James H., 4,303,095, Cl. 137-493.800.
Burruss, Robert P., Jr. Device for evaporation and inhalation of volatile compounds and medications. 4,303,083, Cl. 131-271.000.
Busch, Joachim: *See—*
Heinlein, Karl H.; and Busch, Joachim, 4,303,542, Cl. 252-91.000.
C.O.M.E.T. Compagnie de Material et d'Equipement Techniques: *See—*
Moryl, Richard; and Bouery, Roger, 4,303,361, Cl. 411-108.000.
C. Reichert Optische Werke, AG: *See—*
Sitte, Hellmuth, 4,302,950, Cl. 62-514.00R.
Caffrey, Terence, to Davey Compressor Company. Bleed valve particularly for a multi-stage compressor. 4,303,372, Cl. 415-121.00A.
Cahalan, Maurice J.: *See—*
Rendall, John S.; and Cahalan, Maurice J., 4,303,620, Cl. 423-6.000.
Calabrese, Michael A. Drywall and plastering knife caddy. 4,303,188, Cl. 224-253.000.
Calabrese, Richard A. Paper cassette. 4,303,235, Cl. 271-162.000.
Callahan, James L.; Shaw, Wilfrid G.; and Miller, Arthur F., to Standard Oil Company. Methods for the regeneration of deactivated phosphomolybdic acid based catalysts. 4,303,550, Cl. 252-413.000.
Campbell, George T. R.; Ohno, Kosaku; and Kasuga, Toshishige, to Algoship International Limited. Horizontal slewing crane. 4,303,166, Cl. 212-233.000.
Campbell, James A., to Red Valve Company, Inc. Pinch valve. 4,303,222, Cl. 251-7.000.
Campbell, John E.; and Delahunt, Robert M., to Polaroid Corporation. Alkaline fluid photographic processing composition containers. 4,303,750, Cl. 430-208.000.
Campbell, John E.; and Kelly, Neal F., to Polaroid Corporation. Rupturable photographic processing alkaline fluid container. 4,303,751, Cl. 430-208.000.
Camplin, Harry R.; and Shackleton, Michael A., to United States of America, Army. Engine air cleaner. 4,303,423, Cl. 55-337.000.
Canals, Jose M.; and Canals, Ramon M. Selectively interlocked double security doors. 4,302,907, Cl. 49-65.000.
Canals, Ramon M.: *See—*
Canals, Jose M.; and Canals, Ramon M., 4,302,907, Cl. 49-65.000.
Cannon, Michael: *See—*
D'Angelo, George; and Cannon, Michael, 4,303,915, Cl. 340-711.000.
Canon Kabushiki Kaisha: *See—*
Kiuchi, Masayoshi; and Saito, Syuichiro, 4,303,326, Cl. 354-234.000.
Someya, Hiromi, 4,303,322, Cl. 354-31.000.
Cantella, Emiliano, to Atom S.p.A. Fast operation device for the head in die-cutting machines, particularly flag type. 4,302,998, Cl. 83-524.000.
Capes, Charles E.; and Coleman, Richard D., to Arcanum Corporation. Selective separation of hydrophilic component from mixtures using pastes. 4,303,505, Cl. 209-5.000.
Carice International Products, Ltd.: *See—*
Luk, Catherine M., 4,302,971, Cl. 73-356.000.
Carini, George F., to Clay Harden Company, The. Continuous casting mold flux powders. 4,303,120, Cl. 164-472.000.
Carl Zeiss-Stiftung: *See—*
Basista, Heinrich, 4,303,312, Cl. 350-427.000.
Carlin, William W.; and McCann, Douglas W., to PPG Industries, Inc. Production of alkali metal silicate having a high silica to alkali metal oxide ratio. 4,303,487, Cl. 204-180.00P.
Carlson, Gerald E.: *See—*
Haupt, George J.; Carlson, Gerald E.; and Evanitsky, Eugene S., 4,303,334, Cl. 355-133.000.

Carmichael, Leland E.; Appel, Max J. G.; and McGregor, Douglas D., to Cornell Research Foundation, Inc. Modified living canine parvovirus vaccine. 4,303,645, Cl. 424-89.000.
Carrick, Virgil P. Swivel-rocker base. 4,303,219, Cl. 248-425.000.
Carrier Corporation: *See—*
Bell, William W., 4,302,945, Cl. 62-81.000.
Carson Products Company: *See—*
de la Guardia, Mario; and Cowsar, Donald R., 4,303,085, Cl. 132-7.000.
Cary, Paul D., to BASF Aktiengesellschaft. Precision actuation switch. 4,303,813, Cl. 200-52.00R.
Casciano, Frederick M. Steerable towed vehicle. 4,302,858, Cl. 9-310.00B.
Casensky, Bohuslav: *See—*
Kralicek, Jaroslav; Kubanek, Vladimir; Marik, Jiri; Kondelikova, Jaroslava; Machacek, Jiri; and Casensky, Bohuslav, 4,303,778, Cl. 528-312.000.
Cassella Aktiengesellschaft: *See—*
Piesch, Steffen; and Wolf, Alfons, 4,303,561, Cl. 260-15.000.
Cassens, Dietrich; and Dowedeit, Hans-Werner, to O&K Orenstein & Koppel Aktiengesellschaft Werk Lubeck. Crane with telescopic jibs. 4,303,165, Cl. 212-184.000.
Caterpillar Tractor Co.: *See—*
Lockhart, David A., 4,303,362, Cl. 411-153.000.
Cavalleri, Bruno; Pagani, Hermes; and Volpe, Giancarlo, to Gruppo Lepetit S.p.A. Antibiotic A/16686 and process for preparation thereof. 4,303,646, Cl. 424-118.000.
Cayen, Donald J.; and Janeczko, John T., to Giddings & Lewis, Inc. Power drawfinger system for machine tool spindle. 4,303,360, Cl. 409-233.000.
Caylor, L. Justin: *See—*
Prince, Jack A.; Abernathy, L. Wayne; and Caylor, L. Justin, 4,303,206, Cl. 241-24.000.
Cegedur Societe de Transformation de l'Aluminium Pechiney: *See—*
Colas, Francois, 4,302,874, Cl. 29-426.600.
Celia, Giovanni: *See—*
Di Pietro, Joseph; and Celia, Giovanni, 4,303,675, Cl. 424-343.000.
Center for Blood Research, Inc.: *See—*
Laura, Richard; and Bing, David H., 4,303,592, Cl. 260-543.00F.
Centre Techniques des Industries Mecaniques: *See—*
Mortier, Francois; and Sabatier, Jean-Jacques, 4,303,481, Cl. 204-25.000.
Centro Ricerche Fiat S.p.A.: *See—*
Tavoni, Gian Paolo; and Baima, Mario, 4,302,969, Cl. 73-170.00R.
Trost, Sergio, 4,303,559, Cl. 260-2.300.
Cerroni, Manlio. Decantation cyclones. 4,303,421, Cl. 55-290.000.
Cervin, Carl G., to Cervinter AB. Work facilitating apparatus for conveying building material from a higher to a lower level. 4,303,363, Cl. 414-10.000.
Cervinter AB: *See—*
Cervin, Carl G., 4,303,363, Cl. 414-10.000.
Ceserani, Roberto: *See—*
Gandolfi, Carmelo; Passarotti, Carlo; Andreoni, Alessandro; Fumagalli, Angelo; Faustini, Franco; Ceserani, Roberto; and Usardi, Maria M., 4,303,670, Cl. 424-285.000.
Cespino, Frank G.: *See—*
Houdek, Ladd E.; Cespino, Frank G.; and Yezbick, Patrick A., 4,303,728, Cl. 428-315.000.
Chaborski, Hoiko, to MITEC-Moderne Industrietechnik GmbH. Method and apparatus for measuring time. 4,303,983, Cl. 364-569.000.
Challen, Ian A.; East, Sandra; and Sanderson, George R., to Internationale Octrooi Maatschappij "OCTROPA". Meat filled pie containing chemically set gel particles and process. 4,303,681, Cl. 426-92.000.
Champion International Corporation: *See—*
Fremont, Henry A., 4,303,533, Cl. 210-791.000.
Chance, Davey J.: *See—*
Bell, Oliver A., Jr.; Gilleland, Randall C.; and Chance, Davey J., 4,303,957, Cl. 361-88.000.
Chaney, Clarence E.: *See—*
Fava, Ronald A.; and Chaney, Clarence E., 4,303,783, Cl. 528-488.000.
Fava, Ronald A.; and Chaney, Clarence E., 4,303,784, Cl. 528-488.000.
Chang, Joseph J., to Western Electric Company, Incorporated. Printed wiring board. 4,303,715, Cl. 428-137.000.
Charters, William W. S.; and Taylor, Leonard E., to University of Melbourne, The. Solar boosted heat pump. 4,302,942, Cl. 62-235.100.
Chasek, Norman E. Universally applicable, in-motion and automatic toll paying system using microwaves. 4,303,904, Cl. 340-23.000.
Chattem, Inc.: *See—*
Pratt, Charles E.; and Colburn, Charles S., Jr., 4,303,538, Cl. 252-37.700.
Chemische Werke Huels, A.G.: *See—*
Kosswig, Kurt; and Wienhoefer, Ekkehard, 4,303,544, Cl. 252-174.210.
Chemplex Company: *See—*
Pullukat, Thomas J.; and Shida, Mitsuzo, 4,303,770, Cl. 526-96.000.
Chen, Catherine S. H.; Luh, Yuhshi; and Schmitt, Kirk D., to Mobil Oil Corporation. Fluorine-containing tracers for subterranean petroleum and mineral containing formations. 4,303,411, Cl. 23-230.0EP.
Chen, Gordon T., to Monsanto Company. Hydroesterification process. 4,303,589, Cl. 260-410.90R.
Chen, Jason K. S. Toothpaste dispenser. 4,303,110, Cl. 141-362.000.
Chevron Research Company: *See—*
Blevins, Theodore R., 4,303,126, Cl. 166-245.000.
Chikata, Tsukasa; Sunami, Yoshihiko; Sasaki, Keiichi; and Nishioka, Kunihiko, to Sumitomo Metal Industries Limited. Process for manufacture of solvent for coal liquefaction. 4,303,498, Cl. 208-93.000.
Chisso Corporation: *See—*
Ando, Masao, 4,303,826, Cl. 219-301.000.
Kobayashi, Kazuo; and Hirai, Heima, 4,303,619, Cl. 422-205.000.
Chiyomaru, Isao; Sugiyama, Hidetoshi; Niita, Koyata; Fujimori, Kunihiko; Hirano, Tadayoshi; and Tada, Osamu, to Kumiai Chemical Industry Co., Ltd. Organic phosphoric acid ester derivatives, a process for preparing the same and insecticidal, miticidal or nematocidal compositions containing the same. 4,303,653, Cl. 424-203.000.
Chou, Kechia J., to Texaco Inc. Hydrocarbyl carbamidopropanamide, its method of preparation and lubricating oil composition containing same. 4,303,535, Cl. 252-51.50A.
Chou, Ta-sen; Heath, Perry C.; and Luke, Wayne D., to Eli Lilly and Company. Removal of stannic chloride. 4,303,591, Cl. 260-429.700.
Chow, Wai Y.; and Thackaberry, S. Paul, to Gulf Oil Corporation. Novel acetylene end-capped esterimides. 4,303,775, Cl. 528-170.000.
Chrichton, John P.; Trebel, John M.; Cuff, George W.; Goodwin, David H.; and Levy, Edward D., to Litton Industrial Products, Inc. Socket wrench. 4,302,990, Cl. 81-60.000.
Christenson, Roger M.: *See—*
Becher, David Z.; Christenson, Roger M.; Coalson, Richard L.; Pierce, Percy E.; and Schimmel, Karl F., 4,303,764, Cl. 525-327.000.
Chrysler Corporation: *See—*
Platzer, George E., Jr., 4,303,050, Cl. 123-549.000.
Chun, Joo H. Passive solar heating system. 4,303,058, Cl. 126-430.000.
Chung, Wang C. Portable multi-function apparatus. 4,303,086, Cl. 132-73.600.
Church, Shirley L.; and Hilts, Loren M., to Goodyear Tire & Rubber Company, The. Distillation separation method. 4,303,479, Cl. 203-89.000.
Ciba-Geigy Corporation: *See—*
Michaelis, Klaus-Peter, 4,303,578, Cl. 260-45.75B.
Schmuck, Gunter; and Wegehaupt, Dieter, 4,303,456, Cl. 156-78.000.
Ciboit, Jacques J.: *See—*
Laguilharre, Pierre R.; and Ciboit, Jacques J., 4,303,468, Cl. 159-47.00R.
Ciciora, Walter S., to Zenith Radio Corporation. Raster manipulated television receiver. 4,303,940, Cl. 358-142.000.
Cie and Baumgartner Papier S. A.: *See—*
Boegli, Serge; and Lebet, Jean-Pierre, 4,303,080, Cl. 131-202.000.
Cincinnati Electronics Corporation: *See—*
Weller, Carroll E.; and Woodruff, Thomas J., 4,303,892, Cl. 330-286.000.
Ciocci, Giancarlo: *See—*
Marangelli, Ugo; Ciocci, Giancarlo; and Papa, Sisto S., 4,303,407, Cl. 8-643.000.
Cities Service Co.: *See—*
Anderson, Howard A., 4,303,174, Cl. 220-263.000.
Claas, Helmut; and Tophinke, Franz, to Claas OHG. Radial blowing device for a cleaning arrangement of a harvester thresher. 4,303,079, Cl. 130-272.000.
Claas OHG: *See—*
Claas, Helmut; and Tophinke, Franz, 4,303,079, Cl. 130-272.000.
Clamp Swing Pricing Co.: *See—*
Garfinkle, Benjamin L., 4,303,217, Cl. 248-221.100.
Clark, Gary R. Hand-held instrument for inspecting drill bits. 4,303,299, Cl. 350-90.000.
Clark, Malcolm, to Compair Construction and Mining Ltd. Compressed-gas-operated reciprocating piston devices. 4,303,131, Cl. 173-134.000.
Clark, Terence J.: *See—*
LaCourse, William C.; and Clark, Terence J., 4,303,446, Cl. 501-35.000.
Claverie, Claude, to Thomson-CSF. Demodulation device for frequency modulated electrical signals. 4,303,888, Cl. 329-103.000.
Clay Harden Company, The: *See—*
Carini, George F., 4,303,120, Cl. 164-472.000.
Clemensen, Carl L.; and Mastalka, Frank T. Roof insulation structure and method of making same. 4,303,713, Cl. 428-121.000.
Clough, Philip J., to Ludlow Corporation. Dielectric product. 4,303,720, Cl. 428-211.000.
Cnandler Evans Inc.: *See—*
White, Albert H.; and Zagranski, Raymond D., 4,302,931, Cl. 60-39.28R.
Coal Industry (Patents) Limited: *See—*
Haskew, Francis A.; and Jones, Leslie A., 4,303,275, Cl. 299-31.000.
McCue, John, 4,303,859, Cl. 250-338.000.
Coalson, Richard L.: *See—*
Becher, David Z.; Christenson, Roger M.; Coalson, Richard L.; Pierce, Percy E.; and Schimmel, Karl F., 4,303,764, Cl. 525-327.000.
Cochrane, Ronald L.: *See—*
Palmour, Hayne, III; Gay, Billy M.; and Cochrane, Ronald L., 4,303,448, Cl. 501-127.000.
Cocron, Istvan: *See—*
Hell, August; and Cocron, Istvan, 4,303,319, Cl. 354-25.000.
Coe, Everett L., Jr., to Joy Manufacturing Company. Discharge electrode in precipitator. 4,303,418, Cl. 55-145.000.
Coen Company, Inc.: *See—*
Voorheis, Temple S.; Vosper, Ralph R.; Binasik, Chester S.; and Harthun, Norman, 4,303,386, Cl. 431-177.000.

Coffey, Manus, to Murco Environmental Limited. Refuse disposal system. 4,303,010, Cl. 100-100.000.

Cohen, Abraham B.: *See*—
Beske, Grant A.; Cohen, Abraham B.; and Uhler, Roger O., 4,303,698, Cl. 427-96.000.

Cohen, Donald P., to Travel-Drink, Inc. Beverage dispenser holder which is readily mountable on a vehicle dashboard. 4,303,109, Cl. 141-98.000.

Cohen, Milton J. Hypodermic syringe with needle guide. 4,303,069, Cl. 128-218.00N.

Cohen, William D.: *See*—
Kramer, Joel; and Cohen, William D., 4,303,955, Cl. 360-93.000.

Colas, Francois, to Cegedur Societe de Transformation de l'Aluminium Pechiney. Method of forming pipe union. 4,302,874, Cl. 29-426.600.

Colburn, Charles S., Jr.: *See*—
Pratt, Charles E.; and Colburn, Charles S., Jr., 4,303,538, Cl. 252-37.700.

Coleco Industries, Inc.: *See*—
Yoseloff, Mark L., 4,303,398, Cl. 434-335.000.

Coleman, Richard D.: *See*—
Capes, Charles E.; and Coleman, Richard D., 4,303,505, Cl. 209-5.000.

Collins, David J., to General Electric Company. Thrust bearing wear detector positioner. 4,302,963, Cl. 73-1.00J.

Collins, Gerald, to United Kingdom Atomic Energy Authority. Magnetic filtration. 4,303,504, Cl. 209-223.00R.

Colt Industries Operating Corp: *See*—
Bell, Oliver A., Jr.; Gilleland, Randall C.; and Chance, Davey J., 4,303,957, Cl. 361-88.000.
Wheeler, Dean F., 4,302,936, Cl. 60-290.000.

Columbus Show Case Company, The: *See*—
Aschinger, William T., 4,303,288, Cl. 312-215.000.

Combustion Engineering, Inc.: *See*—
Wheeler, Louis B., 4,303,424, Cl. 55-365.000.

Commercial Decal, Inc.: *See*—
Andrews, Ray, 4,303,717, Cl. 428-200.000.

Commonwealth Scientific and Industrial Research Organization: *See*—
Jones, Francis W.; Mayfield, Robert J.; and O'Loughlin, Gary J., 4,303,652, Cl. 424-200.000.
Swingler, Donald L., 4,303,865, Cl. 250-423.00R.

Compagnie Generale des Etablissements Michelin: *See*—
Flechtner, Charles; Herbelleau, Yves; and Pommier, Jean, 4,303,115, Cl. 152-209.00R.
Jarrige, Guy; and Reiniche, Andre, 4,303,119, Cl. 164-462.000.

Compagnie Generale pour les Developpements Operationnels des Richesses Sous-Marines: *See*—
Marion, Henri A., 4,303,352, Cl. 405-206.000.

Compair Construction and Mining Ltd.: *See*—
Clark, Malcolm, 4,303,131, Cl. 173-134.000.
Godolphin, Reginald O., 4,303,133, Cl. 173-134.000.

Conley, Richard A.; Lam, Margaret M.; and High, Leroy B., to E. R. Squibb & Sons, Inc. Substituted β-anilino-γ-methoxy-crotonates. 4,303,795, Cl. 560-43.000.

Connolly, Terry; Patrick, Milton L.; Rudolph, Thomas E.; and Stanley, Alan, to American Hospital Supply Corporation. Medical liquid bag having an improved additive port. 4,303,067, Cl. 128-272.000.

Conoco Inc.: *See*—
Thakur, Pramod C., 4,303,274, Cl. 299-12.000.

Consarc Corporation: *See*—
Roberts, Raymond J., 4,303,797, Cl. 13-13.000.

Cook, Melvin S. Method of peeling thin films using directional heat flow. 4,303,463, Cl. 156-603.000.

Cook, Tommy D. Communication system for supplementing off-air or cable TV signals with locally generated video messages. 4,303,937, Cl. 358-86.000.

Cooke, Theodore M.: *See*—
Whitfield, Richard G.; and Cooke, Theodore M., 4,303,445, Cl. 106-22.000.

Cooke, William E.: *See*—
Bjorkholm, John E.; Freeman, Richard R.; Panock, Richard L.; and Cooke, William E., 4,303,840, Cl. 307-427.000.

Coombs, Lawrence J.: *See*—
Thompson, Duncan M.; Swanson, Harold V.; and Coombs, Lawrence J., 4,303,038, Cl. 119-14.360.

Cooper Industries, Inc.: *See*—
Snider, Philip A., 4,303,252, Cl. 279-35.000.

Cope, Michael E., to Forney Engineering Company. Industrial control system with interconnected remotely located computer control units. 4,304,001, Cl. 371-8.000.

Copeland, Hugh D., to United States of America, Navy. Light burst activity analyzer. 4,303,410, Cl. 23-230.00R.

Coppock, Earl E. Method of making a shoe buildup. 4,302,861, Cl. 12-142.00S.

Corn, John E., Jr.: *See*—
Norton, Richard V.; Zehner, Lee R.; Pascoe, Ralph F.; Corn, John E., Jr.; and Grote, Dace, 4,303,594, Cl. 260-546.000.

Cornell Research Foundation, Inc.: *See*—
Carmichael, Leland E.; Appel, Max J. G.; and McGregor, Douglas D., 4,303,645. Cl. 424-89.000.

Costerousse, Germain: *See*—
Deraedt, Roger; Teutsch, Jean G.; and Costerousse, Germain, 4,303,654, Cl. 424-243.000.

Costruzioni Aeronautiche Giovanni Agusta S.p.A.: *See*—
Porro, Francesco; Gabriele, Cosimo; and Hotz, Walter, 4,303,866, Cl. 250-442.000.

Coudreuse, Michel: *See*—
Bonnerot, Georges; Senn, Patrice; and Coudreuse, Michel, 4,304,000, Cl. 370-70.000.

Coulter Electronics, Inc.: *See*—
James, Bobby D.; Simpson, Ronald O.; and Starling, J. David, 4,303,337, Cl. 356-72.000.

Courduvelis, Constantine I.; and Gallager, George C. Selective removal of copper or nickel from complexing agents in aqueous solution. 4,303,704, Cl. 427-345.000.

Cousimano, Robert D. Adjustable (D)-port insert header for internal combustion engines. 4,302,935, Cl. 60-272.000.

Coutures, Jean L.: *See*—
Berger, Jean L.; and Coutures, Jean L., 4,303,839, Cl. 307-304.000.

Covell, John; and Brulin, Laurence, to Covell, John. Anti-slipping attachment for shoes. 4,302,890, Cl. 36-7.600.

Coward, Michael D., to Georgetown Steel Corporation. Apparatus for producing aluminum-deoxidized continuously cast steel. 4,303,118, Cl. 164-415.000.

Cowsar, Donald R.: *See*—
de la Guardia, Mario; and Cowsar, Donald R., 4,303,085, Cl. 132-7.000.

Cox, Louis F., Jr., to Menardi-Southern Corp. Filter bag assembly. 4,303,425, Cl. 55-378.000.

Cox, Robert D.: *See*—
Frank, Clyde W.; Nord, Paul J.; and Cox, Robert D., 4,303,419, Cl. 55-185.000.

Crafon Medical AB: *See*—
Oettle, George W.; and Hakansson, Bo H., 4,302,972, Cl. 73-362.0AR.

Crandon, Reba L.; and Marple, Elwood. Swimming pool solar heater. 4,303,057, Cl. 126-415.000.

Crass, Gunther: *See*—
Gebhardt, Dieter; Crass, Gunther; and Janocha, Siegfried, 4,303,708, Cl. 428-35.000.

Crathern, Roger N.: *See*—
Love, Leonard S.; and Crathern, Roger N., 4,303,517, Cl. 210-208.000.

Crewe, Albert V.; and Kopf, David A., to United States of America, Energy. Sextupole system for the correction of spherical aberration. 4,303,864, Cl. 250-396.00R.

Crisp, David: *See*—
Thompson, David K.; and Crisp, David, 4,303,082, Cl. 131-75.000.

Cristy, Nicholas G.: *See*—
Hoffend, Donald A., Jr.; and Cristy, Nicholas G., 4,303,237, Cl. 272-22.000.

Crosby, Lawton H., to Morley Furniture Spring Corporation. Seat spring assembly (torque-coil). 4,303,232, Cl. 267-88.000.

Crosfield Electronics Limited: *See*—
Wayman, William G., 4,302,981, Cl. 74-89.150.

Crutchfield, Marvin M.; and Dyroff, David R., to Monsanto Company. Acetal carboxylic acid polymers. 4,303,777, Cl. 525-398.000.

Cselt-Centro Studi e Laboratori Telecomunicazioni S.p.A.: *See*—
Ansaldi, Renato; and Vallero, Sergio, 4,303,837, Cl. 307-262.000.

Cuff, George W.: *See*—
Chrichton, John P.; Trebel, John M.; Cuff, George W.; Goodwin, David H.; and Levy, Edward D., 4,302,990, Cl. 81-60.000.

Cull, Neville L., to Exxon Research & Engineering Co. Treatment of reducing gas for suppression of corrosiveness. 4,303,625, Cl. 423-213.200.

Cullis, Herbert M., to Baxter Travenol Laboratories, Inc. Method and apparatus for making a rapid measurement of the hematocrit of blood. 4,303,336, Cl. 356-39.000.

Cumpston, Edward H., to Venmark Corporation. Monitoring system using telephone circuit. 4,303,802, Cl. 179-2.00A.

Customized Controls, Inc.: *See*—
Kengle, Fritz; and Young, James E., 4,303,194, Cl. 236-15.00E.

Cutler, Robert S.; and Lindquist, Robert M., to International Business Machines Corporation. Hot roll cleaning paste and method. 4,303,545, Cl. 252-174.210.

Czarnecki, Adolph, to Kinop International, Inc. Trip motion simulator. 4,303,236, Cl. 272-18.000.

Czerwien, Arthur S. A.; and Feyer, Heinz E. Multi-function A.C. power meter. 4,303,881, Cl. 324-142.000.

Daigle, Michael A.: *See*—
Richards, Thomas E.; Harvey, James P.; and Daigle, Michael A., 4,303,524, Cl. 210-406.000.

Daikin Kogyo Co., Ltd.: *See*—
Hisamoto, Iwao; Maeda, Chiaki; Esaka, Takasige; and Nishiwaki, Mitsuhiro, 4,303,534, Cl. 252-3.000.

Daimler-Benz Aktiengesellschaft: *See*—
Haberle, Fritz; Riechers, Daniel; and Heusel, Richard, 4,303,267, Cl. 293-155.000.

Daiwa Can Company, Limited: *See*—
Iino, Toshio, 4,302,995, Cl. 83-104.000.

Dakss, Mark L.: *See*—
Ramsey, Hubert J.; and Dakss, Mark L., 4,303,302, Cl. 350-96.200.

D'Andrea, Mark J., to National Patent Development Corporation. Burn dressing. 4,303,066, Cl. 128-156.000.

Danek, Josef, to Air Shields, Inc. Probe for transcutaneous sampling. 4,303,076, Cl. 128-635.000.

Danerlov, Ove: *See*—
Andersson, Rickard; and Danerlov, Ove, 4,303,164, Cl. 212-146.000.

D'Angelo, George; and Cannon, Michael. Silent communicator. 4,303,915, Cl. 340-711.000.

D'Angelo, Ralph, to Bell Telephone Laboratories, Incorporated. Key and keyway arrangement. 4,302,982, Cl. 74-89.150.

Dart Industries Inc.: *See*—
Nergard, Orv B., 4,303,173, Cl. 220-254.000.

d'Auria, Luigi: *See*—
Pressiat, Robert; de Corlieu, Guy; Malard, Marcel; and d'Auria, Luigi, 4,303,300, Cl. 350-96.200.

Davey Compressor Company: *See*—
Caffrey, Terence, 4,303,372, Cl. 415-121.00A.

Davidson, Harvey D. Method and apparatus for removing embedded ticks. 4,303,268, Cl. 294-16.000.

Davis, Edwin D. Thermionic electric converter. 4,303,845, Cl. 310-306.000.

Davis, Eldon, to Norden Laboratories, Inc. Feline infectious peritonitis virus vaccines. 4,303,644, Cl. 424-89.000.

Davis, Thomas J.; and Perry, Charles B., to Electric Power Research Institute, Inc. Digitally controlled multifrequency eddy current test apparatus and method. 4,303,885, Cl. 324-237.000.

Davis, Woodrow G. Animal carrier and passageway. 4,303,258, Cl. 280-403.000.

DCA Food Industries, Inc.: *See*—
Kaufman, Harold B., Jr.; and McCarthy, John P., 4,303,819, Cl. 219-10.55R.

de la Guardia, Mario; and Cowsar, Donald R., to Carson Products Company. System and method for hair treatment. 4,303,085, Cl. 132-7.000.

De Acetis, James, to Quaker Oats Company, The. Frozen pizza process. 4,303,677, Cl. 426-27.000.

deBruyn, William: *See*—
Ibraham, Fayez F.; Subera, Elmer; and deBruyn, William, 4,302,948, Cl. 62-256.000.

Deckys, Jonas E. Modular display system. 4,302,897, Cl. 40-605.000.

de Corlieu, Guy: *See*—
Pressiat, Robert; de Corlieu, Guy; Malard, Marcel; and d'Auria, Luigi, 4,303,300, Cl. 350-96.200.

Deere & Company: *See*—
Gage, Douglas M.; and Thompson, Warren L., 4,303,089, Cl. 137-113.000.
Shindelar, Aloysius C., 4,303,098, Cl. 137-614.060.

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Buchanan, Relva C.; DeFord, H. Dale; and Sircar, Anup, 4,303,447, Cl. 501-103.000.

DeFreitas, Richard E., to Analog and Digital Systems, Inc. Reproducing multichannel sound. 4,303,800, Cl. 179-1.00G.

Degussa & Henkel Kommanditgesellschaft auf Aktien: *See*—
Strack, Hans; Roebke, Wolfgang; Kneitel, Dieter; and Parr, Ehrfried, 4,303,626, Cl. 423-329.000.
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DeHart, George. Hunters and trappers scent pad. 4,302,899, Cl. 43-1.000.

Dekker, Lambert: *See*—
Boden, Richard M.; Dekker, Lambert; Schmitt, Frederick L.; and Van Loveren, Augustinus G., 4,303,555, Cl. 252-522.00R.

Delahunt, Robert M.: *See*—
Campbell, John E.; and Delahunt, Robert M., 4,303,750, Cl. 430-208.000.

Delavarenne, Serge Y.: *See*—
Schirmann, Jean-Pierre; and Delavarenne, Serge Y., 4,303,586, Cl. 260-348.310.
Schirmann, Jean-Pierre; and Delavarenne, Serge Y., 4,303,587, Cl. 260-348.310.

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DelVecchio, Evo. Quick disconnect bag filter. 4,303,519, Cl. 210-238.000.

DeMaria, Francesco; and Young, Chi C., to American Cyanamid Company. Process for melt spinning acrylonitrile polymer fiber using hot water as stretching aid. 4,303,607, Cl. 264-178.00F.

de Mimerand, Yvan de R.; and Goullet, Jean, to Hotchkiss-Brandt Sogeme H.B.S. Machine for sorting articles. 4,303,503, Cl. 209-3.300.

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Martel, Jacques; Tessier, Jean; Teche, Andre; and Demoute, Jean-Pierre, 4,303,585, Cl. 260-343.30R.

Denki Kagaku Kogyo Kabushiki Kaisha: *See*—
Takahashi, Kohki; Kondoh, Takeo; Koga, Masao; and Nishiwaki, Kenichiro, 4,303,560, Cl. 260-4.00R.

Dent, Thomas H.; Sumpman, Wayne C.; and Wilhelm, John J., to Westinghouse Electric Corp. Remote docking apparatus. 4,303,368, Cl. 414-590.000.

Deraedt, Roger; Teutsch, Jean G.; and Costerousse, Germain, to Roussel Uclaf. Novel 21-chloro-20-acetylenic steroids. 4,303,654, Cl. 424-243.000.

Descente Ltd.: *See*—
Maeshima, Seiichi, 4,302,850, Cl. 2-102.000.

Design Cote Corp.: *See*—
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Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See*—
Lussling, Theodor; Muller, Klaus-Peter; Schreyer, Gerd; and Theissen, Ferdinand, 4,303,621, Cl. 423-189.000.

Deutsche Texaco Aktiengesellschaft: *See*—
Geistert, Walter; Kramer, Ulrich; and Klippel, Gottfried, 4,303,499, Cl. 208-33.000.

DeWolf, Robert B., II; and Glemza, Rimantas, to W. R. Grace & Co. Hydrous silica gel containing dentifrice. 4,303,641, Cl. 424-49.000.

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Boldt, Robert T., 4,302,888, Cl. 34-48.000.

Diffracto Ltd.: *See*—
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Dimeff, John. Non-contacting device for sensing multi-component motion. 4,303,919, Cl. 340-870.370.

Dines, David R., to Western Electric Company, Inc. Method of seating connector terminals on circuit board contact pads. 4,303,291, Cl. 339-17.00B.

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DiNovo, Salvatore T.; and Ballantyne, Wayne E., to International Paper Company. Process and apparatus for recovery of spent pulping liquors. 4,303,469, Cl. 162-30.00R.

Di Pietro, Joseph; and Celia, Giovanni, to Anic, S.p.A. Mosquito repellent. 4,303,675, Cl. 424-343.000.

Dismukes, Newton B. Earth boring guide. 4,303,134, Cl. 175-61.000.

Ditto, Peter J.; Ellerbrock, Donald H.; and Pelton, Peter G., to Boise Cascade Corporation. Composite end closure member for composite containers. 4,303,190, Cl. 229-5.600.

Diver, James J.: *See*—
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Divis, Vaclav: *See*—
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Dix, Stephen P. Septic leaching system. 4,303,350, Cl. 405-36.000.

Dixon, Dale D.; and Ford, Michael E., to Air Products and Chemicals, Inc. Polyalkylenecarbonate compositions with improved thermal stability and method for making same. 4,303,759, Cl. 525-3.000.

Dixon, Guy E.; and Mack, William M., Jr., to Panelfold, Inc. Multidirectional canted wheel carrier with shiftable control arm for operable walls. 4,302,865, Cl. 16-97.000.

Dolman, Roy S., to White-BSA Tools Ltd. Multi-spindle lathes. 4,302,993, Cl. 82-29.00R.

Dom-Sicherheitstechnik GmbH & Co. KG: *See*—
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Dompas, John M. A., to Metallurgie Hoboken-Overpelt. Apparatus for cutting a moving metallic strip into uniform pieces. 4,303,227, Cl. 266-69.000.

Dooley, Graham C.; and Dunlop, Alistair J., to Marconi Company Limited, The. Radio systems and apparatus. 4,303,211, Cl. 244-3.190.

Dorner, Hubert, to Goetze AG. Stressed internal face lapping tool. 4,302,909, Cl. 51-157.000.

Dornier-System GmbH: *See*—
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Dorr-Oliver Incorporated: *See*—
Eichler, Jack H.; Freeman, Mark P.; and Salancy, William A., 4,303,492, Cl. 204-300.00R.

Dorsic, Josef. Double throttle valve carburator. 4,303,047, Cl. 123-327.000.

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Dotson, Ronald L.; and Lynch, Richard W., to Olin Corporation. Purification of alkali metal chloride brines. 4,303,624, Cl. 423-184.000.

Dougherty, John J., Jr. Point attachment for foundation pile. 4,303,353, Cl. 405-253.000.

Doughman, Charles L.: *See*—
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Dow Chemical Company, The: *See*—
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Kangas, Donald A., 4,303,642, Cl. 424-78.000.
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Kehrer, Gerald P.; and Smith, William G., 4,303,735, Cl. 428-391.000.

Dow Corning GmbH: *See*—
Laepple, Werner; and Wienert, Gisela, 4,303,537, Cl. 252-30.000.

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Drackett Company, The: *See*—
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Drake, Charles F.; and Rooth, Charles A. Chart drive mechanism. 4,303,926, Cl. 346-68.000.
Drake, John L., Jr.: *See*—
Ticker, Arthur; Preiser, Herman S.; Klemens, William; and Drake, John L., Jr., 4,303,608, Cl. 264-40.100.
Drebinger, Peter, to Siemens Aktiengesellschaft. Method and apparatus for calculating the green light time in traffic-dependently controllable street traffic signal systems. 4,303,905, Cl. 340-41.00R.
Dresser Industries, Inc.: *See*—
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Drew Chemical Corporation: *See*—
Boylan, Francis J., 4,303,549, Cl. 252-321.000.
Driver, Ronald W., to Rolls-Royce Limited. Method of applying a ceramic coating to a metal workpiece. 4,303,693, Cl. 427-34.000.
Droeser, Walter. Brush for rotating brush rollers in sweeping machines. 4,302,863, Cl. 15-183.000.
D'Silva, Themistocles D. J., to Union Carbide Corporation. Hybrid 1,3-dione-carbamate compounds. 4,303,669, Cl. 424-282.000.
Dual Gebruder Steidinger GmbH & Co.: *See*—
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DuBell, Thomas L., to United Technologies Corporation. Combuster liner construction for gas turbine engine. 4,302,941, Cl. 60-757.000.
Ducasse, Joseph C. V. Continuous separation system. 4,303,522, Cl. 210-297.000.
Duclot, Michel: *See*—
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Dufey, Victor A. Apparatus for measuring the mechanical characteristics of a body. 4,302,967, Cl. 73-84.000.
Dulac, Robert R. Wood-burning boiler. 4,303,198, Cl. 237-56.000.
Dull, Hans-Jurgen, to Siemens Aktiengesellschaft. Long stator linear motor without iron. 4,303,017, Cl. 104-294.000.
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Baseden, Gerald A., 4,303,697, Cl. 427-54.100.
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Gosser, Lawrence W., 4,303,632, Cl. 423-591.000.
Ostapchenko, George J., 4,303,573, Cl. 260-40.00R.
Seiler, Henry K.; and Sommerfeld, Eugene G., 4,303,488, Cl. 204-181.00R.
Durden, John A., Jr.; and Kurtz, Arthur P., Jr., to Union Carbide Corporation. 2-Oximino-tetrahydro-1,4-oxazin-3-ones. 4,303,788, Cl. 544-164.000.
Dussud, Jean-Benoit. Installation for handling by table with bearing balls. 4,303,279, Cl. 308-6.00C.
Dykmans, Maximiliaan J. Means and techniques useful in stressing cable. 4,302,978, Cl. 73-828.000.
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Dynamit Nobel AG: *See*—
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Dyroff, David R.: *See*—
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Lamisse, Michel G., 4,303,441, Cl. 75-109.000.
Marcus, Michael A., 4,303,324, Cl. 354-195.000.
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Eberly, Paul E., Jr.; Mauldin, Charles H.; and Baird, William C., Jr., to Exxon Research & Engineering Co. Reforming with multimetallic catalysts. 4,303,500, Cl. 208-139.000.
Eckel, John D.; and Einerson, Amos M., to A. Y. McDonald Manufacturing Company. Natural energy operated pump system. 4,303,833, Cl. 290-1.00R.
Eckert, Terry T., to General Electric Company. Shroud support with impingement baffle. 4,303,371, Cl. 415-116.000.
Edagawa, Hiroshi; Fujita, Toshinori; and Uesugi, Yasuo, to Toray Industries, Inc. Multi-component spun yarn and method and apparatus for manufacturing same. 4,302,925, Cl. 57-58.950.
Edwards, Fred S. Shipping carton assembly for automobile taillight assemblies. 4,303,157, Cl. 206-335.000.
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Berenyi nee Poldermann, Edit; Szirt nee Kiszelly, Eniko; Gorog, Peter; Petocz, Lujza; Kosoczky, Ibolya; Kovacs nee Palotai, Agnes; and Urmos nee Lassu, Gabriella, 4,303,660, Cl. 424-251.000.
Ehrat, Kurt, to Gretag Aktiengesellschaft. Process for assessing the quality of a printed product. 4,303,832, Cl. 250-556.000.
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Eichler, Jack H.; Freeman, Mark P.; and Salancy, William A., to Dorr-Oliver Incorporated. Electrode assembly. 4,303,492, Cl. 204-300.00R.
Eickmann, Karl. Snap ring assembly for two bodies. 4,303,004, Cl. 91-488.000.
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Eisenberg, Arnold J., to Owens-Corning Fiberglas Corporation. Apparatus and method for production of mineral fibers. 4,303,429, Cl. 65-1.000.
Eisses, Jacobus A. Restored vibration isolation for railway tracks. 4,303,199, Cl. 238-2.000.
Ekstrom, Philip A., to Battelle Development Corporation. Photon detector system. 4,303,861, Cl. 250-370.000.
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Elfving, Goran L.; and Farquhar, George N., to Aktiebolaget Partner. Engine regulator for a power saw. 4,302,880, Cl. 30-382.000.
El Hamamsy, Mahmoud A., to Bell Telephone Laboratories, Incorporated. Optically triggered linear bilateral switch. 4,303,831, Cl. 250-551.000.
Elhaus, Friedrich W. Preheating furnace. 4,303,388, Cl. 432-246.000.
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Pearce, Homer L., 4,303,584, Cl. 260-244.400.
Elkins, Christopher W.; Smith, David W.; and Trenary, John, to Teledyne Industries, Inc. Showering system. 4,303,201, Cl. 239-383.000.
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Emma, Sam F. Manual shovelling and dumping devices. 4,302,894, Cl. 37-130.000.
Emmett, James S., to Warner-Lambert Company. Razor blade with inclined edge. 4,302,876, Cl. 30-47.000.
Emmons, William D.; and Feely, Wayne E. Coating, impregnating and adhesive compositions curable at ambient temperature. 4,303,563, Cl. 260-23.0AR.
Enemark, Robert B.; Galvin, Aaron A.; and Marchetti, Stephen, to American District Telegraph Company. Electronic sounder. 4,303,908, Cl. 340-384.00E.
Energy Design Corporation: *See*—
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Enomoto, Shigeo; and Shimoda, Mitsuhiko, to Asahi Kogaku Kogyo Kabushiki Kaisha. Photographic camera of automatic focussing type. 4,303,321, Cl. 354-25.000.
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Marti, Bernard; Poignet, Alain; Fournier, Claude; and Roche, Christian, 4,303,941, Cl. 358-147.000.

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Euverard, Maynard R.; Heide, Henry A.; and Diver, James J., to Velten & Pulver, Inc. Continuous chain stacker/unstacker. 4,303,365, Cl. 414-37.000.

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Haupt, George J.; Carlson, Gerald E.; and Evanitsky, Eugene S., 4,303,334, Cl. 355-133.000.

Exacto-Mac Limited Partnership: *See—*
MacGregor, Paul E., 4,302,883, Cl. 33-180.0AT.

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Baker, Richard H., 4,303,841, Cl. 307-570.000.
Cull, Neville L., 4,303,625, Cl. 423-213.200.
Eberly, Paul E., Jr.; Mauldin, Charles H.; and Baird, William C., Jr., 4,303,500, Cl. 208-139.000.
Jansen, Deborah S.; and Puydak, Robert C., 4,303,571, Cl. 260-33.6AQ.
O'Farrell, Charles P.; and Kresge, Edward N., 4,303,766, Cl. 525-353.000.
Song, Won R., 4,303,539, Cl. 252-47.000.
Whitfield, Richard G.; and Cooke, Theodore M., 4,303,445, Cl. 106-22.000.

F. J. Burrus: *See—*
Boegli, Serge; and Lebet, Jean-Pierre, 4,303,080, Cl. 131-202.000.

F. Jos. Lamb Company: *See—*
Skrentner, Frank C., 4,302,992, Cl. 82-19.000.

Fabeg GmbH: *See—*
Teichert, Heinrich; and Pfatteicher, Bruno, 4,303,301, Cl. 350-96.180.

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Bourlet, Maurice V., 4,303,015, Cl. 102-492.000.

Fain, David A. Catapult game. 4,303,247, Cl. 273-324.000.

Fall, Don R.; and Lamarche, Paul E., to Borg-Warner Corporation. Torsional vibration damper. 4,302,951, Cl. 64-27.00C.

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Mitchell, Thomas O.; Whitehurst, Darrell D.; and Farcasiu, Malvina, 4,303,497, Cl. 208-10.000.

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Elfving, Goran L.; and Farquhar, George N., 4,302,880, Cl. 30-382.000.

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Bagdasarov, Khachik S.; Khaimov-Malkov, Valentin Y.; Ilin, Nikolai P.; Starostin, Jury A.; Fedorov, Evgeny A.; and Sedakov, Nikolai I., 4,303,465, Cl. 156-616.00R.

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Emmons, William D.; and Feely, Wayne E., 4,303,563, Cl. 260-23.0AR.

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Eshbach, John R.; Felter, Richard E.; and Posipanko, Thomas, 4,303,716, Cl. 428-188.000.

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Tschacher, Hans-Dieter, 4,302,910, Cl. 51-170.0MT.

Feyer, Heinz E.: *See—*
Czerwien, Arthur S. A.; and Feyer, Heinz E., 4,303,881, Cl. 324-142.000.

Field, Edwin L., to Arthur D. Little, Inc. Process for distillatively separating liquid mixtures. 4,303,478, Cl. 203-19.000.

Finkelstein, Alberto L., to Mollura Industries. Method of making baffled lap welded waterbed mattress bag. 4,303,460, Cl. 156-273.000.

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Kay, Edward L.; and Lohr, Delmar F., 4,303,597, Cl. 260-933.000.

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Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,303,689, Cl. 426-537.000.

Fischer, John F., to Smith International, Inc. Method for making a cone for a rock bit and product. 4,303,137, Cl. 175-374.000.

Fischer, Kurt: *See—*
Goede, Simon; and Fischer, Kurt, 4,303,849, Cl. 315-241.00P.

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Torgersen, Daniel L.; and Fischer, Leon H., 4,303,701, Cl. 427-145.000.

Fischer & Porter Company: *See—*
Yard, John S., 4,303,980, Cl. 364-510.000.

Fischer, Wilhelm: *See—*
Marks, Helmuth; and Fischer, Wilhelm, 4,303,103, Cl. 138-97.000.

Fisher Scientific Company: *See—*
Jarmell, Solomon; and Rodgers, Barry E., 4,303,615, Cl. 422-102.000.

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Engwall, Sten; and Fitch, Clifford K., 4,303,225, Cl. 254-344.000.

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Fixler, Stanley. Waste oil heater having fuel control system. 4,303,055, Cl. 126-93.000.

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Flanagan, Joseph E.: *See—*
Frankel, Milton B.; and Flanagan, Joseph E., 4,303,414, Cl. 44-63.000.

Flaxman, Michael. Automobile washing and drying installation. 4,303,087, Cl. 134-58.00R.

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Focke, Heinz; and Liedtke, Kurt, 4,303,155, Cl. 206-264.000.

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Fogg, O. Douglas: *See—*
Haag, George A.; Fogg, O. Douglas; Greenley, Gordon A.; Shepard, Steve A.; and Terry, F. Duncan, 4,303,987, Cl. 364-900.000.

Foglesong, Robert M.; and Arden, Terry D. Closable vane turbine ventilator. 4,303,375, Cl. 415-167.000.

Ford, Fisher A., Jr. Portable receptacle. 4,303,178, Cl. 220-345.000.

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Dixon, Dale D.; and Ford, Michael E., 4,303,759, Cl. 525-3.000.

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Houdek, Ladd E.; Cespino, Frank G.; and Yezbick, Patrick A., 4,303,728, Cl. 428-315.000.
Natkin, Robert J., 4,302,985, Cl. 74-403.000.

Ford, R. Gary, to Energy Design Corporation. Apparatus for solar energy collection. 4,303,059, Cl. 126-438.000.

Ford, Roger W.: *See—*
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Andriessen, Ronald C.; and Holt, Peter J., 4,302,958, Cl. 72-71.000.

Forney Engineering Company: *See—*
Cope, Michael E., 4,304,001, Cl. 371-8.000.

Forni, Francoise: *See—*
Hidalgo, Jaime; Wenner, Valentin; and Forni, Francoise, 4,303,580, Cl. 260-113.000.

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Green, Charles J.; and Forsythe, Alan K., 4,303,088, Cl. 137-102.000.

Foster, Norman; and Elson, Raymond A., to British-American Tobacco Company Limited. Hinged-lid packet for cigarettes. 4,303,191, Cl. 229-44.0CB.

Foundry Design Corp.: *See*—
Jung, Werner; and Oswald, Jack, 4,303,453, Cl. 134-10.000.

Fournet, Robert L.: *See*—
Starr, George N., 4,302,886, Cl. 33-312.000.

Fournier, Claude: *See*—
Marti, Bernard; Poignet, Alain; Fournier, Claude; and Roche, Christian, 4,303,941, Cl. 358-147.000.

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Williamson, Robert A., Jr.; and Ford, Roger W., 4,303,973, Cl. 364-103.000.

Frank, Clyde W.; Nord, Paul J.; and Cox, Robert D., to University of Iowa Research Foundation. Method and composition for determination of N-nitrosamines. 4,303,419, Cl. 55-185.000.

Frank, Walter; Bendszus, Otto; Freier, Hansjoachim; and Traenckner, Hans-Joachim, to Bayer Aktiengesellschaft. Process for the production of thinlayer polyester coatings. 4,303,567, Cl. 260-29.2UA.

Franke, Rudiger; Fauerbach, Rudolf; Wenzel, Michael; and Weiss, Aby, to Mannesmann DeMag AG. Transport apparatus for heavy open-cast working equipment. 4,303,140, Cl. 180-6.200.

Frankel, Milton B.; and Flanagan, Joseph E., to Rockwell International Corporation. Azido additives for liquid hydrocarbon motor fuels. 4,303,414, Cl. 44-63.000.

Frankforter, Norris K., to Lincoln Manufacturing Co. Tire repair device. 4,303,380, Cl. 425-27.000.

Fransson, Lars-Ake: *See*—
Lindahl, Ulf P. F.; Backstrom, Gudrun E.; Thunberg, John Y. L.; Fransson, Lars-Ake; Andersson, Lars-Olov; Holmer, Erik Y.; Sandberg, Inga H.; and Soderstrom, Ewa G., 4,303,651, Cl. 424-183.000.

Franzen, Gustav, to Palitex Project Company GmbH. Self-threading yarn brake mechanism. 4,302,930, Cl. 57-279.000.

Freel, John; Montagna, John C.; and Ryu, Seh M., to Gulf Research & Development Company. Multistage clean-up of product gas from underground coal gasification. 4,303,127, Cl. 166-266.00Ò.

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Goldstein, Leon; Freeman, Amihay; and Sokolovsky, Mordechai, 4,303,786, Cl. 536-51.000.

Freeman, Mark P.: *See*—
Eichler, Jack H.; Freeman, Mark P.; and Salancy, William A., 4,303,492, Cl. 204-300.00R.

Freeman, Richard R.: *See*—
Bjorkholm, John E.; Freeman, Richard R.; Panock, Richard L.; and Cooke, William E., 4,303,840, Cl. 307-427.000.

Freier, Hansjoachim: *See*—
Frank, Walter; Bendszus, Otto; Freier, Hansjoachim; and Traenckner, Hans-Joachim, 4,303,567, Cl. 260-29.2UA.

Fremont, Henry A., to Champion International Corporation. Method of removing fine suspended solids from effluent streams. 4,303,533, Cl. 210-791.000.

Freuhauf Corporation: *See*—
Schwartz, Robert B.; Miller, Frank J.; and Vij, Hem R., 4,302,913, Cl. 52-39.000.

Fried, Krupp Gesellschaft mit beschrankter Haftung: *See*—
Kramp, Walter; and Philipp, Clemens, 4,302,994, Cl. 83-23.000.

Frisbee, Gregory A.: *See*—
Hogue, Marcus P.; and Frisbee, Gregory A., 4,303,971, Cl. 362-297.000.

Fryday Corporation: *See*—
Hice, Jaxon O.; and Webb, Gerald J., 4,303,008, Cl. 99-353.000.

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Yukuta, Toshio; Yagura, Kazuo; and Fuchigami, Nobuhisa, 4,303,755, Cl. 521-52.000.

Fuel Inc.: *See*—
Persinger, James G., 4,303,422, Cl. 55-319.000.

Fuji Xerox Co., Ltd.: *See*—
Arai, Yoshio; Kataoka, Hiroyuki; Suzuki, Isao; and Yokota, Shozo, 4,303,948, Cl. 358-287.000.

Fujikura Rubber Works, Ltd.: *See*—
Otsuka, Katsuyuki; Ohuchi, Jin; and Arita, Shizuo, 4,302,848, Cl. 2-2.000.

Fujimori, Kunihiko: *See*—
Chiyomaru, Isao; Sugiyama, Hidetoshi; Niita, Koyata; Fujimori, Kunihiko; Hirano, Tadayoshi; and Tada, Osamu, 4,303,653, Cl. 424-203.000.

Fujinaga, Takamasa: *See*—
Nagao, Masato; Ito, Yoshiyasu; Wase, Keizou; Kazawa, Yoshiaki; and Fujinaga, Takamasa, 4,303,473, Cl. 376-150.000.

Fujisawa Pharmaceutical Co., Ltd.: *See*—
Kamiya, Takashi; Tanaka, Kunihiko; Nakai, Yoshiharu; and Sakane, Kazuo, 4,303,655, Cl. 424-246.000.

Fujita, Hiroshi: *See*—
Tsuboka, Eiichi; Maehara, Fumio; Fujita, Hiroshi; Izura, Yoshiteru, deceased; and Izura, Keiko, heir, 4,303,988, Cl. 364-900.000.

Fujita, Masahiko; Hayashi, Kenji; and Konno, Kazutoshi, to Hitachi, Ltd. Tape drive device. 4,303,210, Cl. 242-200.000.

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Iyama, Yukio; Fujita, Masao; and Higashiiriki, Nobuhiro, 4,303,229, Cl. 266-135.000.

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Edagawa, Hiroshi; Fujita, Toshinori; and Uesugi, Yasuo, 4,302,925, Cl. 57-58.950.

Fujita, Yoshiji: *See*—
Okabe, Susumu; Omura, Yoshiaki; Ninagawa, Yoichi; and Fujita, Yoshiji, 4,303,588, Cl. 260-404.500.

Fujiwara, Yoshio: *See*—
Nishimura, Makoto; Omori, Yoshio; and Fujiwara, Yoshio, 4,303,760, Cl. 525-117.000.

Fukuda, Shin; and Hirashima, Masayoshi, to Matsushita Electric Industrial Co., Ltd. Sampling clock reproducing apparatus. 4,303,942, Cl. 358-147.000.

Fukuda, Yoji: *See*—
Tohda, Takao; Nitta, Tsuneharu; Fukuda, Yoji; Matsuoka, Tomizo; and Terada, Ziro, 4,303,913, Cl. 340-704.000.

Fukui, Jun; Niwa, Senji; Kawashima, Norihiro; Ueshima, Kenro; and Shimizu, Katumi, to Kawasaki Jukogyo Kabushiki Kaisha. Catalytic reactor. 4,303,618, Cl. 422-190.000.

Fukumoto, Khoki: *See*—
Sugiyama, Kiyoshi; Matsuba, Masaharu; Iwagami, Fusao; and Fukumoto, Khoki, 4,303,928, Cl. 346-75.000.

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Ohnishi, Hiroshi; Fukuyama, Hiroshi; and Yokota, Yasushi, 4,302,966, Cl. 73-66.000.

Fumagalli, Angelo: *See*—
Gandolfi, Carmelo; Passarotti, Carlo; Andreoni, Alessandro; Fumagalli, Angelo; Faustini, Franco; Ceserani, Roberto; and Usardi, Maria M., 4,303,670, Cl. 424-285.000.

Futaba Denshi Kogyo Kabushiki Kaisha: *See*—
Kishino, Takao; Ichihara, Fumio; and Yamaguchi, Nobuo, 4,303,917, Cl. 340-772.000.

Fuyama, Hiroshi; and Tsuji, Kozo, to Sumitomo Chemical Company, Ltd. Oil-in-water organophosphorus insecticidal emulsion. 4,303,640, Cl. 424-78.000.

Gabriele, Cosimo: *See*—
Porro, Francesco; Gabriele, Cosimo; and Hotz, Walter, 4,303,866, Cl. 250-442.000.

Gaffre, Michel, to U.S. Philips Corporation. Monolithic electroluminescent semiconductor assembly. 4,303,931, Cl. 357-17.000.

Gage, Douglas M.; and Thompson, Warren L., to Deere & Company. Steering including accumulator for supplying emergency reserve of fluid. 4,303,089, Cl. 137-113.000.

Gaillard, Hubert: *See*—
Hureau, Jacques; Hureau, Jean-Claude; and Gaillard, Hubert, 4,303,609, Cl. 264-504.000.

Gainer, Gordon C., to Westinghouse Electric Corp. Thermal storage method and apparatus. 4,302,944, Cl. 62-59.000.

Gaiser, Robert F., to Bendix Corporation, The. Quick take-up disc brake assembly. 4,303,146, Cl. 188-71.800.

Gale, Robert M.: *See*—
Shell, John W.; and Gale, Robert M., 4,303,637, Cl. 424-14.000.

Galimov, Anas G.: *See*—
Maslakov, Petr A.; Klushin, Nikolai A.; Juriev, Leonid A.; Kokarev, Vladimir I.; Kilin, Viktor E.; Galimov, Anas G.; Sutyagin, Oleg Y.; and Yankovsky, Oleg A., 4,303,002, Cl. 91-225.000.

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Courduvelis, Constantine I.; and Gallager, George C., 4,303,704, Cl. 427-345.000.

Gallasch, Hubert, to BBC Brown, Boveri & Company, Limited. Foundation for a vibrating machine. 4,303,220, Cl. 248-679.000.

Gallusser, David O.; Hemmer, Valentine J.; Toombs, Gary C.; and Brush, Robert W., to Bendix Corporation, The. Core pin for making a plastic connector shell having an internal keyway. 4,303,221, Cl. 249-102.000.

Galvin, Aaron A.: *See*—
Enemark, Robert B.; Galvin, Aaron A.; and Marchetti, Stephen, 4,303,908, Cl. 340-384.00E.

Gambro AB: *See*—
Stenberg, Kaj O., 4,303,458, Cl. 156-158.000.

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Lehmann, Hans-Dieter, 4,303,521, Cl. 210-282.000.

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Ganster, Otto; Meiners, Hans J.; Eifler, Willi; Meyborg, Holger; and Schwindt, Jurgen, to Bayer Aktiengesellschaft. Process for the production of polyurethane urea elastomers. 4,303,773, Cl. 528-64.000.

Gar Doc, Incorporated: *See*—
La Mers, Herbert, 4,303,461, Cl. 156-361.000.

Garcelon, Jean P., to Stein Surface. Process for the adjustment of the glass temperature in a float glass lehr and float glass lehr in order to bring this process into operation. 4,303,437, Cl. 65-99.00A.

Garfinkle, Benjamin L., to Clamp Swing Pricing Co. Pegboard stabilizer. 4,303,217, Cl. 248-221.100.

Garrett Corporation, The: *See*—
Manfredo, Joseph N.; and Hirsch, Selwyn R., 4,303,052, Cl. 123-563.000.

Garrett Electronics: *See*—
Podhrasky, Robert J., 4,303,879, Cl. 324-329.000.

Gatsis, John G., to UOP Inc. Method of catalyst preparation. 4,303,634, Cl. 423-561.00R.

Gaull, Gerald E. Infant milk formula. 4,303,692, Cl. 426-580.000.

Gautschi, Fritz: *See*—
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,303,689, Cl. 426-537.000.

Gay, Billy M.: *See*—
Palmour, Hayne, III; Gay, Billy M.; and Cochrane, Ronald L., 4,303,448, Cl. 501-127.000.

Gearhart Industries, Inc.: *See*—
Schwind, Edward C.; and Hallmark, Bobby J., 4,302,881, Cl. 33-178.00F.

Gebhardt, Dieter; Crass, Gunther; and Janocha, Siegfried, to Hoechst Aktiengesellschaft. Heat-sealable plastic film, process for its manufacture, and the use of the film. 4,303,708, Cl. 428-35.000.

Gebler, Kenneth A.: *See*—
Adams, Paul G.; and Gebler, Kenneth A., 4,303,700, Cl. 427-135.000.

Gebruder Buhler AG: *See*—
Geiger, Armin; and Grauer, Kurt, 4,303,205, Cl. 241-17.000.

Gebruder Junghans GmbH: *See*—
Wolber, Robert; Maurer, Roland; and Jesse, Peter, 4,303,962, Cl. 361-399.000.

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Riegel, Hans; and Kurzhals, Gerd, 4,303,007, Cl. 98-40.00D.

Geffner, Ted. Open antifriction bearings and method of operating the same. 4,303,280, Cl. 308-6.00C.

Gehrig, Oskar, deceased: *See*—
Wasel-Nielen, Joachim; Merkenich, Karl; Gehrig, Oskar, deceased; and Sommer, Klaus, 4,303,541, Cl. 252-70.000.

Geiger, Allen R. Clear air turbulence detector. 4,303,862, Cl. 250-372.000.

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Geiger, Gary E.: *See*—
May, Roger C.; and Geiger, Gary E., 4,303,568, Cl. 260-29.6MP.

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Gellert, Jobst U. Melt spinning nozzle tip. 4,303,382, Cl. 425-566.000.

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Baxi, Chandrakant B., 4,303,474, Cl. 376-175.000.
Hurn, Edwin J.; and Kissinger, John A., 4,303,475, Cl. 376-394.000.

General Dynamics, Pomona Division: *See*—
Wood, John H.; and Twaddell, Victor A., 4,303,480, Cl. 204-15.000.

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Braddy, Bruce T., 4,303,374, Cl. 416-97.00R.
Collins, David J., 4,302,963, Cl. 73-1.00J.
Eckert, Terry T., 4,303,371, Cl. 415-116.000.
Hogue, Marcus P.; and Frisbee, Gregory A., 4,303,971, Cl. 362-297.000.
Kinsey, Richard R.; Halbritter, George W.; Binsley, David L.; Rasmussen, Allan E.; and Totten, Howard Q., 4,303,898, Cl. 333-114.000.
Kyles, Bruce W., 4,303,827, Cl. 219-512.000.
Maher, William M., 4,303,282, Cl. 308-36.000.
Racz, Janos A.; and Seppi, Edward J., 4,303,863, Cl. 250-385.000.
Smith, Peter H., 4,303,818, Cl. 219-10.55B.
Stottmann, Richard L.; and Eisenbeis, Edwin C., 4,303,820, Cl. 219-10.810.
Vostovich, Joseph E., 4,303,574, Cl. 260-42.150.
Wolfinger, John F., 4,303,882, Cl. 324-158.0MG.

General Foods Corporation: *See*—
Pitchon, Esra; and Schulman, Marvin, 4,303,684, Cl. 426-312.000.
Seidel, William C.; Stahl, Howard D.; and Orozovich, George E., 4,303,451, Cl. 127-32.000.
Stolz, Robert P.; Ouellette, Norman P.; Linthorst, Johanna M.; and Herlihy, Thomas V., 4,303,686, Cl. 426-386.000.
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,303,689, Cl. 426-537.000.

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Gold, Terry J.; Kennard, Frederick L., III; Kikuchi, Paul C.; and Wilhelm, Ralph V., Jr., 4,303,490, Cl. 204-192.00C.
Lundquist, Roger J., 4,303,513, Cl. 210-132.000.
Meginnis, George B., 4,302,940, Cl. 60-754.000.
Snarski, Thomas R., 4,303,228, Cl. 266-96.000.

Gent, John T.: *See*—
Litchfield, William B.; Gent, John T.; and Graham, James A. S., 4,303,737, Cl. 428-406.000.

Genter, Claude: *See*—
Arnoux, Daniel; Koehler, Gerard; Leconte, Andre; Genter, Claude; and Michel, Bernard, 4,303,843, Cl. 310-67.00R.

Gentry, Don C. Dental handpiece. 4,303,393, Cl. 433-130.000.

GEO Space Corporation: *See*—
McNeel, William O., 4,303,292, Cl. 339-45.00M.

Geolograph Company, The: *See*—
Williams, Henry L., 4,302,962, Cl. 73-1.00E.

George Koch Sons, Inc.: *See*—
Koch, Robert L., II, 4,303,417, Cl. 55-96.000.

Georgetown Steel Corporation: *See*—
Coward, Michael D., 4,303,118, Cl. 164-415.000.

Geosource Inc.: *See*—
Kalb, Gerald F., 4,303,100, Cl. 137-853.000.

Gerrand, Henry J. F. Method of making wheels, pulleys and tumblers. 4,302,872, Cl. 29-159.030.

Gfeller, Fritz: *See*—
Bapst, Urs H.; Gfeller, Fritz; and Vettiger, Peter, 4,303,855, Cl. 250-226.000.

Ghafghaichi, Majid: *See*—
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Giddings & Lewis, Inc.: *See*—
Cayen, Donald J.; and Janeczko, John T., 4,303,360, Cl. 409-233.000.

Gilbert, John F.: *See*—
Shaw, Jack C.; Gilbert, John F.; Olbrechts, Guy R.; and McIntyre, Melville D., 4,303,978, Cl. 364-453.000.

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Membrino, Robert J.; and Gilbreath, George D., Jr., 4,303,989, Cl. 364-900.000.

Gildemeister Aktiengesellschaft: *See*—
Schalles, Erhard; Stender, Reinhard; and Seeger, Herbert, 4,302,870, Cl. 29-40.000.

Gilleland, Randall C.: *See*—
Bell, Oliver A., Jr.; Gilleland, Randall C.; and Chance, Davey J., 4,303,957, Cl. 361-88.000.

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Gini, Donald; Larson, Theodore L.; Merten, Ronald A.; and Simonetti, Alex, to International Business Machines Corporation. Magnetic media having tridecyl stearate lubricant. 4,303,738, Cl. 428-423.100.

GKSS-Forschungszentrum Geesthacht GmbH: *See*—
Kneifel, Klemens; Hilgendorff, Walther; and Martens, Uwe, 4,303,493, Cl. 204-301.000.

Glaser, David, to Lucitron, Inc. Flat-panel display with gas-impervious metallic sheet forming part of sealed enclosure. 4,303,847, Cl. 313-217.000.

Glaser, Horst; and Tamm, Rolf, to Bodenseewerk Perkin-Elmer & Co., GmbH. Graphite tube assembly. 4,303,339, Cl. 356-244.000.

Glemza, Rimantas: *See*—
DeWolf, Robert B., II; and Glemza, Rimantas, 4,303,641, Cl. 424-49.000.

Glenn, William H.: *See*—
Snitzer, Elias; and Glenn, William H., 4,302,970, Cl. 73-339.00R.

Glomski, Norman J.; and Schelman, Buddy C., to Heil Company, The. Hydraulic cylinder assembly. 4,303,005, Cl. 92-52.000.

Gobel, Wilhelm: *See*—
Musch, Rudiger; Schubart, Rudiger; Gobel, Wilhelm; and Pampus, Gottfried, 4,303,765, Cl. 525-343.000.

Godolphin, Reginald O., to Compair Construction & Mining Limited. Compressed-gas-operated reciprocating-piston devices. 4,303,133, Cl. 173-134.000.

Goede, Simon; and Fischer, Kurt, to Zellweger Uster Limited. Process and apparatus for charging a capacitor and application of the process. 4,303,849, Cl. 315-241.00P.

Goeke, George L.: *See*—
Wagner, Burkhard E.; Goeke, George L.; and Karol, Frederick J., 4,303,771, Cl. 526-125.000.

Goessler, Gerhard; and Koch, Friedrich, to E.G.O. Regeltechnik GmbH. Cooker apparatus for heating a cooking pot inductively. 4,303,816, Cl. 219-10.49R.

Goetze AG: *See*—
Dorner, Hubert, 4,302,909, Cl. 51-157.000.

Gold, Terry J.; Kennard, Frederick L., III; Kikuchi, Paul C.; and Wilhelm, Ralph V., Jr., to General Motors Corporation. Exhaust electrode process for exhaust gas oxygen sensor. 4,303,490, Cl. 204-192.00C.

Goldberg, Edwin A., to RCA Corporation. Frequency synthesizer incorporating digital frequency translator. 4,303,893, Cl. 331-1.00A.

Goldman, Irving M.: *See*—
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,303,689, Cl. 426-537.000.

Goldstein, Leon; Freeman, Amihay; and Sokolovsky, Mordechai, to Ramot - Tel-Aviv University. Isonitrile derivatives of macromolecules containing hydroxyl groups. 4,303,786, Cl. 536-51.000.

Golestaneh, Ahmad A., to United States of America, Energy. Solid state engine using nitinol memory alloy. 4,302,939, Cl. 60-527.000.

Gooding, Thomas L. Paddle. 4,303,402, Cl. 440-101.000.

Goodwin, David H.: *See*—
Chrichton, John P.; Trebel, John M.; Cuff, George W.; Goodwin, David H.; and Levy, Edward D., 4,302,990, Cl. 81-60.000.

Goodwin, Robert A.; and Allen, David V., to Polaroid Corporation. Tamper resistant snap-fit strobe housing. 4,303,964, Cl. 362-16.000.

Goodyear Tire & Rubber Company, The: *See*—
Church, Shirley L.; and Hilts, Loren M., 4,303,479, Cl. 203-89.000.
Oliveira, Paul E., 4,303,723, Cl. 428-247.000.

Gopalakrishna, Yelandur R.: *See*—
Barkley, Keith G.; Ghafghaichi, Majid; Gopalakrishna, Yelandur R.; and Tzou, Albert J., 4,303,992, Cl. 365-51.000.

Goralnik, Charles D. Mounting assembly for a chandelier-type light fixture. 4,303,968, Cl. 362-147.000.

Gordon, Robert T. Cancer treatment. 4,303,636, Cl. 424-1.000.

Gordon, Theodore P.: *See*—
Tureck, Al; and Gordon, Theodore P., 4,303,307, Cl. 350-276.00R.

Gorog, Peter: *See*—
Berenyi nee Poldermann, Edit; Szirt nee Kiszelly, Eniko; Gorog, Peter; Petocz, Lujza; Kosoczky, Ibolya; Kovacs nee Palotai, Agnes; and Urmos nee Lassu, Gabriella, 4,303,660, Cl. 424-251.000.

Gosser, Lawrence W., to Du Pont de Nemours, E. I., and Company. Preparation of hydrogen peroxide. 4,303,632, Cl. 423-591.000.

Gottschlich, Herbert: *See*—
Behrmann, Alfred; Gottschlich, Herbert; Koch, Christian; and Abel, Otto, 4,303,495, Cl. 208-8.0LE.

Goudie, Alexander C., to Beecham Group Limited. Substituted decalins, their preparation and use. 4,303,674, Cl. 424-331.000.

Gould Inc.: *See*—
Leiker, Dale H., 4,302,960, Cl. 72-402.000.
Goullet, Jean: *See*—
de Mimerand, Yvan de R.; and Goullet, Jean, 4,303,503, Cl. 209-3.300.
Graham, James A. S.: *See*—
Litchfield, William B.; Gent, John T.; and Graham, James A. S., 4,303,737, Cl. 428-406.000.
Graham, Thomas G., to Singer Company, The. Linear feed regulating control for a sewing machine. 4,303,031, Cl. 112-316.000.
Grauer, Kurt: *See*—
Geiger, Armin; and Grauer, Kurt, 4,303,205, Cl. 241-17.000.
Green, Charles J.; and Forsythe, Alan K., to Sprague Devices, Inc. Pneumatic valve and regulator assembly. 4,303,088, Cl. 137-102.000.
Green, Edward A.: *See*—
Johansen, Hans A.; Phillippi, Larry R.; and Green, Edward A., 4,303,457, Cl. 156-149.000.
Greenley, Gordon A.: *See*—
Haag, George A.; Fogg, O. Douglas; Greenley, Gordon A.; Shepard, Steve A.; and Terry, F. Duncan, 4,303,987, Cl. 364-900.000.
Gretag Aktiengesellschaft: *See*—
Ehrat, Kurt, 4,303,832, Cl. 250-556.000.
Grey, Vincent G. Safety control system for container operations. 4,303,169, Cl. 220-1.500.
Grimm, Daniel J.; Unger, John M.; and Virag, Robert A., to Baxter Travenol Laboratories, Inc. Ventilator humidifier. 4,303,601, Cl. 261-142.000.
Grimm, Gerold; and Kemmner, Ulrich, to Robert Bosch GmbH. Electromagnetic fuel control element. 4,303,901, Cl. 335-272.000.
Grosshandler, Sandor, to Dow Chemical Company, The. Low pressure high volume filter apparatus. 4,303,518, Cl. 210-236.000.
Grote, Dace: *See*—
Norton, Richard V.; Zehner, Lee R.; Pascoe, Ralph F.; Corn, John E., Jr.; and Grote, Dace, 4,303,594, Cl. 260-546.000.
Gruber, Robert J.; and Bolte, Steven B., to Xerox Corporation. Single component magnetic toner with epoxy resin. 4,303,749, Cl. 430-39.000.
Grunwald, Davor, to Harco Electronics Limited. Connection for electrodes. 4,303,293, Cl. 339-61.00M.
Gruppo Lepetit S.p.A.: *See*—
Cavalleri, Bruno; Pagani, Hermes; and Volpe, Giancarlo, 4,303,646, Cl. 424-118.000.
Grusa, Arnold, to Montanwerke Walter GmbH. Boring tool with a plurality of cutter chips. 4,303,358, Cl. 408-223.000.
GTE Automatic Electric Laboratories, Inc.: *See*—
Morgan, John H.; and Sutton, Larry W., 4,303,824, Cl. 219-121.0FS.
GTE Laboratories Inc.: *See*—
Anderson, Robert M.; Schlaikjer, Carl R.; and Shambaugh, John S., 4,303,745, Cl. 429-86.000.
Ramsey, Hubert J.; and Dakss, Mark L., 4,303,302, Cl. 350-96.200.
GTE Products Corporation: *See*—
Anderson, Richard W.; and Schlener, J. Edward, 4,303,801, Cl. 179-5.00R.
Anderson, Robert M.; Schlaikjer, Carl R.; and Shambaugh, John S., 4,303,745, Cl. 429-86.000.
Audesse, Emery G.; Hartman, Donald W.; and Shaffer, John W., 4,303,963, Cl. 362-15.000.
Marincic, Nikola; and McDonald, Robert C., 4,303,744, Cl. 429-52.000.
Sherwood, Robert A.; and Nordberg, Svein T., 4,303,960, Cl. 361-212.000.
Guerndt, H. Fred, Jr.; and Thompson, Kenneth E., to Orange Enterprises, Inc. Pruning boom. 4,302,922, Cl. 56-235.000.
Guitteny, Jean L.; Plaze, Jean P.; Roux, Michel; and Warren, Gregory N., to Mars Incorporated. Process of making meat like food product. 4,303,682, Cl. 426-250.000.
Gulf Oil Corporation: *See*—
Chow, Wai Y.; and Thackaberry, S. Paul, 4,303,775, Cl. 528-170.000.
Gulf Research & Development Company: *See*—
Freel, John; Montagna, John C.; and Ryu, Seh M., 4,303,127, Cl. 166-266.000.
Gulf & Western Industries, Inc.: *See*—
Seipp, William H., 4,303,990, Cl. 364-900.000.
Gulli, Frank. Jumping shoe attachment. 4,302,891, Cl. 36-7.800.
Gulliksen, John E., to Koehler Manufacturing Company. Storage battery construction including bonded plate assembly and methods of making same. 4,303,746, Cl. 429-140.000.
Gusmer, Frederick E. Method of preparing closed cell phenol-aldehyde foam and the closed cell foam thus prepared. 4,303,758, Cl. 521-121.000.
Guurak, Nur; and Tebbens, Klaas, to Polysar Limited. Coagulation of latex. 4,303,569, Cl. 260-29.7PT.
H H & F Enterprises: *See*—
Hope, William K., Sr., 4,302,927, Cl. 57-122.000.
Haag, George A.; Fogg, O. Douglas; Greenley, Gordon A.; Shepard, Steve A.; and Terry, F. Duncan, to Hewlett-Packard Company. Logic state analyzer with graphic display. 4,303,987, Cl. 364-900.000.
Haas, Franz, Jr.: *See*—
Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johann, 4,303,690, Cl. 426-549.000.
Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johann. Process for manufacturing thin-walled, hollow pastry articles. 4,303,690, Cl. 426-549.000.
Haas, Johann: *See*—
Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johann, 4,303,690, Cl. 426-549.000.
Haataja, Bruce A.; and Lund, Anders E., to Michigan Technological University, Board of Control of. Articles molded from papermill sludge. 4,303,019, Cl. 108-51.100.
Haberle, Fritz; Riechers, Daniel; and Heusel, Richard, to Daimler-Benz Aktiengesellschaft. Fastening arrangement on the side of the body of a bumper at the frame of a motor vehicle. 4,303,267, Cl. 293-155.000.
Hachiya, Tomoyoshi: *See*—
Tanekawa, Tetsuo; Takashima, Hiroshi; and Hachiya, Tomoyoshi, 4,303,680, Cl. 426-60.000.
Hack, Joachim, to BASF Aktiengesellschaft. Device for compensating unequal write fields in magnetic data-storage devices, especially in disc memories. 4,303,951, Cl. 360-46.000.
Hacker, Dennis J., to High Efficiency Insulation Technologies, Inc. Sprayable insulation composition. 4,303,450, Cl. 106-88.000.
Hackney, John. Hand puller for ropes. 4,302,869, Cl. 24-115.00R.
Haemonetics Corporation: *See*—
Latham, Allen, Jr., 4,303,193, Cl. 233-23.00A.
Hafele KG: *See*—
Tolksdorf, Reinhold, 4,302,989, Cl. 81-5.10R.
Hafer, Terry D.: *See*—
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Hakansson, Bo H.: *See*—
Oettle, George W.; and Hakansson, Bo H., 4,302,972, Cl. 73-362.0AR.
Hakaridani, Mitsuhiro; Kamada, Hiroshi; Suzuki, Hitoshi; and Osaki, Mikio, to Sharp Kabushiki Kaisha. Multi-item input/output device to input information to and retrieve other information from a terminal computer. 4,303,916, Cl. 340-712.000.
Halbach & Braun: *See*—
Braun, Gert; and Braun, Ernst, 4,303,276, Cl. 299-43.000.
Halbritter, George W.: *See*—
Kinsey, Richard R.; Halbritter, George W.; Binsley, David L.; Rasmussen, Allan E.; and Totten, Howard Q., 4,303,898, Cl. 333-114.000.
Hallmark, Bobby J.: *See*—
Schwind, Edward C.; and Hallmark, Bobby J., 4,302,881, Cl. 33-178.00F.
Ham, David O.; and Tsay, Wei-Shin, to University of Rochester, The. Laser isotope separation and gas purification by multiple photon absorption enhanced by heating. 4,303,483, Cl. 204-157.10R.
Hamby Company, The: *See*—
Mills, Franky, 4,303,129, Cl. 172-530.000.
Hamermesh, Charles L.; Tung, Chiang-Ying M.; and Hogenson, Peter A., to Rockwell International Corporation. Intumescent flame-resistant coating. 4,303,727, Cl. 428-314.000.
Hamill, Robert L.; and Hoehn, Marvin M., to Eli Lilly and Company. Method of treating coccidiosis with antibiotic A-32887K. 4,303,647, Cl. 424-121.000.
Hamilton, Booker T., Jr.: *See*—
Hamilton, Jerrol D.; and Hamilton, Booker T., Jr., 4,303,969, Cl. 362-153.000.
Hamilton, Jerrol D.; and Hamilton, Booker T., Jr. Portable dance floor system. 4,303,969, Cl. 362-153.000.
Hamner, Bobby J.: *See*—
Smelley, Annie G.; Montgomery, Robert W.; and Hamner, Bobby J., 4,303,532, Cl. 210-732.000.
Hampton, Robert S.: *See*—
Morrison, Leonard A.; Hampton, Robert S.; Mountz, Craig E.; Murphy, John W.; and Spainhour, Phillip A., 4,303,338, Cl. 356-155.000.
Hamsher, Wilbur A., Jr.; and Weber, Robert N., to AMP Incorporated. Compound spring contact. 4,303,294, Cl. 339-74.00R.
Hanford, Norris E. Straw distributing apparatus. 4,303,202, Cl. 239-664.000.
Hansen, Ove E., to A/S Niro Atomizer. Atomizer wheel for the atomization of liquids. 4,303,200, Cl. 239-223.000.
Hara, Akio; and Yazu, Shuji, to Sumitomo Electric Industries, Ltd. Diamond sintered body and the method for producing the same. 4,303,442, Cl. 75-243.000.
Hara, Yasuaki: *See*—
Takamizawa, Minoru; Okada, Fumio; Hara, Yasuaki; and Aoki, Hisashi, 4,303,484, Cl. 204-159.130.
Harada, Norimichi: *See*—
Sanmi, Yasumaru; Harada, Norimichi; and Nishida, Yasuhiro, 4,303,401, Cl. 440-88.000.
Harbour, Wilmer P., Jr.; and Heard, Roderick S., to International Business Machines Corporation. Method and apparatus for controlling the position of printed ink droplets. 4,303,925, Cl. 346-1.100.
Harbridge, John B., to Beecham Group Limited. Methylaminodeoxyclavulanic acid derivatives, their production and use. 4,303,665, Cl. 424-272.000.
Harco Electronics Limited: *See*—
Grunwald, Davor, 4,303,293, Cl. 339-61.00M.
Hardy, Terence, to L.B. (Plastics) Limited. Structural components. 4,303,289, Cl. 312-330.00R.
Harra, David J.; and Nystrom, William C., to Varian Associates, Inc. Flange sealing joint with removable metal gasket. 4,303,251, Cl. 277-236.000.
Harris, Edward H.: *See*—
Burke, Richard E.; and Harris, Edward H., 4,303,387, Cl. 432-72.000.

Harrison, John M.: *See—*
Johnson, Avery R.; and Harrison, John M., 4,303,804, Cl. 179-18.0BC.
Hart, David J.: *See—*
Hart, Thomas D.; and Hart, David J., 4,302,877, Cl. 30-161.000.
Hart, John S.: *See—*
Selas, George J.; and Hart, John S., 4,303,147, Cl. 188-298.000.
Hart, Thomas D.; and Hart, David J., to W. R. Case & Sons Cutlery Company. Single spring double lockblade folding knife. 4,302,877, Cl. 30-161.000.
Harthun, Norman: *See—*
Voorheis, Temple S.; Vosper, Ralph R.; Binasik, Chester S.; and Harthun, Norman, 4,303,386, Cl. 431-177.000.
Hartman, Donald W.: *See—*
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Hartness International, Inc.: *See—*
Hartness, Thomas S., 4,302,919, Cl. 53-250.000.
Hartness, Thomas S., to Hartness International, Inc. Case centering device. 4,302,919, Cl. 53-250.000.
Harvey, James P.: *See—*
Richards, Thomas E.; Harvey, James P.; and Daigle, Michael A., 4,303,524, Cl. 210-406.000.
Hasegawa, Masayasu; Nishikawa, Hideo; and Kotani, Yasuo, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Antibacterial and antifungal composition. 4,303,668, Cl. 424-279.000.
Hashimoto, Nobuo: *See—*
Kondo, Takashi; and Hashimoto, Nobuo, 4,303,981, Cl. 364-525.000.
Hashimoto, Nobuyuki; and Satomoto, Atsushi, to Aisin Seiki Kabushiki Kaisha. Thermally responsive valve device. 4,303,195, Cl. 236-48.00R.
Haskew, Francis A.; and Jones, Leslie A., to Coal Industry (Patents) Limited. Slideway means and excavating machines comprising slideway means. 4,303,275, Cl. 299-31.000.
Hatanaka, Masayuki; and Kurita, Atsushi, to Toshiba Silicone Co., Ltd. Curable composition. 4,303,572, Cl. 260-37.0SB.
Haupt, George J.; Carlson, Gerald E.; and Evanitsky, Eugene S., to Xerox Corporation. Heat regulator for the fusing device in an electrostatic copier. 4,303,334, Cl. 355-133.000.
Hawkins, Royal R., to Honeywell Inc. Reset windup limiting. 4,303,873, Cl. 318-301.000.
Hayashi, Kenji: *See—*
Fujita, Masahiko; Hayashi, Kenji; and Konno, Kazutoshi, 4,303,210, Cl. 242-200.000.
Heard, Roderick S.: *See—*
Harbour, Wilmer P., Jr.; and Heard, Roderick S., 4,303,925, Cl. 346-1.100.
Heath, Perry C.: *See—*
Chou, Ta-sen; Heath, Perry C.; and Luke, Wayne D., 4,303,591, Cl. 260-429.700.
Hegler, Ralph-Peter: *See—*
Hegler, Wilhelm; and Hegler, Ralph-Peter, 4,303,104, Cl. 138-121.000.
Hegler, Wilhelm; and Hegler, Ralph-Peter, to Hegler, Wilhelm. Double-wall plastic tubing in which the outer wall has transverse corrugations and the inner wall is smooth. 4,303,104, Cl. 138-121.000.
Hehn, Wilfried; Kurths, Siegfried; Sieber, Werner; and Kocourek, Franz, to AGFA-Gevaert Aktiengesellschaft. Device for processing a photographic film. 4,303,330, Cl. 354-319.000.
Heide, Henry A.: *See—*
Euverard, Maynard R.; Heide, Henry A.; and Diver, James J., 4,303,365, Cl. 414-37.000.
Heidelberger Druckmaschinen Aktiengesellschaft: *See—*
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Heil Company, The: *See—*
Glomski, Norman J.; and Schelman, Buddy C., 4,303,005, Cl. 92-52.000.
Heilman, Marlin S.; and Langer, Alois A., to Mirowski, Mieczyslaw. Method and apparatus for maximizing stroke volume through atrioventricular pacing using implanted cardioverter/pacer. 4,303,075, Cl. 128-419.0PG.
Heinlein, Karl H.; and Busch, Joachim. Powdered detergent or soak. 4,303,542, Cl. 252-91.000.
Heinzelmann, Karl G.; Schmitt, Guenter; and Tschunt, Edgar, to Siemens Aktiengesellschaft. Tomographic apparatus for producing transverse layer images of a radiography subject. 4,303,830, Cl. 250-445.00T.
Hell, August; and Cocron, Istvan, to AGFA-Gevaert Aktiengesellschaft. Unidirectional focussing system. 4,303,319, Cl. 354-25.000.
Helm Instrument Company, Inc.: *See—*
Wilhelm, Donald F., 4,302,996, Cl. 83-212.000.
Helveston, Wilton L.; and Pecoraro, Richard J., to International Moorings & Marine, Inc. Single point mooring system. 4,303,037, Cl. 114-230.000.
Hemmer, Valentine J.: *See—*
Gallusser, David O.; Hemmer, Valentine J.; Toombs, Gary C.; and Brush, Robert W., 4,303,221, Cl. 249-102.000.
Henry, Jack C., to Leon L. Berkowitz Co. Collapsible display rack. 4,303,163, Cl. 211-133.000.
Hepp, Vincent R., to Schlumberger Technology Corporation. Dipmeter displacement qualifying technique. 4,303,975, Cl. 364-422.000.
Herbelleau, Yves: *See—*
Flechtner, Charles; Herbelleau, Yves; and Pommier, Jean, 4,303,115, Cl. 152-209.00R.
Herlihy, Thomas V.: *See—*
Stolz, Robert P.; Ouellette, Norman P.; Linthorst, Johanna M.; and Herlihy, Thomas V., 4,303,686, Cl. 426-386.000.
Hermann Berstorff Maschinenbau GmbH: *See—*
Muller, Werner, 4,303,344, Cl. 366-76.000.
Hermann Fehling Tief-und Kulturbau: *See—*
Fehling, Hermann, 4,303,278, Cl. 305-35.00R.
Hertell, Siegfried; Kirchherr, Claus; and Kahl, Horst, to Barmag Barmer Maschinenfabrik. Hydraulic control apparatus for load independent flow regulation. 4,303,091, Cl. 137-117.000.
Hessari, Manouchahr F., to A.P.V. Company Limited, The. Plate heat exchanger. 4,303,124, Cl. 165-167.000.
Heusel, Richard: *See—*
Haberle, Fritz; Riechers, Daniel; and Heusel, Richard, 4,303,267, Cl. 293-155.000.
Hewlett-Packard Company: *See—*
Haag, George A.; Fogg, O. Douglas; Greenley, Gordon A.; Shepard, Steve A.; and Terry, F. Duncan, 4,303,987, Cl. 364-900.000.
Hey, David G., to Imperial Chemical Industries Limited. Cleaning composition comprising 1,1,2-trichloro-1,2,2-trifluoroethane and an alcohol. 4,303,558, Cl. 252-548.000.
Hice, Jaxon O.; and Webb, Gerald J., to Fryday Corporation. Apparatus for producing a restructured food product. 4,303,008, Cl. 99-353.000.
Hicks, Harlan D. Adjustable container for cigarette packages. 4,303,154, Cl. 206-86.000.
Hidalgo, Jaime; Wenner, Valentin; and Forni, Francoise, to Societe d'Assistance Technique pour Produits Nestle S.A. Metal caseinates. 4,303,580, Cl. 260-113.000.
Higashiiriki, Nobuhiro: *See—*
Iyama, Yukio; Fujita, Masao; and Higashiiriki, Nobuhiro, 4,303,229, Cl. 266-135.000.
High Efficiency Insulation Technologies, Inc.: *See—*
Hacker, Dennis J., 4,303,450, Cl. 106-88.000.
High, Leroy B.: *See—*
Conley, Richard A.; Lam, Margaret M.; and High, Leroy B., 4,303,795, Cl. 560-43.000.
Hight, Roland W.: *See—*
Levine, Morris; Yurcheshen, Michael; and Hight, Roland W., 4,303,581, Cl. 260-18.0PF.
Hilgendorff, Walther: *See—*
Kneifel, Klemens; Hilgendorff, Walther; and Martens, Uwe, 4,303,493, Cl. 204-301.000.
Hill, Carl J. Dual feed conveyor in gizzard processing machine. 4,302,867, Cl. 17-11.000.
Hill, Jeremy R.; and Meyer, Allen E., to United States Surgical Corporation. Electrical liquid conductivity measuring system. 4,303,887, Cl. 324-441.000.
Hilts, Loren M.: *See—*
Church, Shirley L.; and Hilts, Loren M., 4,303,479, Cl. 203-89.000.
Hinchcliffe, Dennis; and Leigh, George C., to Molins Limited. Method and apparatus for unloading rod-like articles from containers. 4,303,366, Cl. 414-419.000.
Hino, Masamichi; and Nishikawa, Hiroshi, to Kubota Ltd. Electronic weighing apparatus. 4,303,139, Cl. 177-210.0FP.
Hiraga, Masaharu; and Terauchi, Kiyoshi, to Sankyo Electric Company Limited. Scroll-type compressor with reduced housing radius. 4,303,379, Cl. 418-55.000.
Hirai, Heima: *See—*
Kobayashi, Kazuo; and Hirai, Heima, 4,303,619, Cl. 422-205.000.
Hirano, Masachika; Ohsumi, Tadashi; Kasamatsu, Kiyoshi; and Kato, Takashi, to Sumitomo Chemical Company, Limited. Cyclopropanecarboxylate insecticides and/or acaricides exhibiting low toxicity to mammals and fish. 4,303,672, Cl. 424-304.000.
Hirano, Tadayoshi: *See—*
Chiyomaru, Isao; Sugiyama, Hidetoshi; Niita, Koyata; Fujimori, Kunihiko; Hirano, Tadayoshi; and Tada, Osamu, 4,303,653, Cl. 424-203.000.
Hirashima, Masayoshi: *See—*
Fukuda, Shin; and Hirashima, Masayoshi, 4,303,942, Cl. 358-147.000.
Hiratani, Hajime: *See—*
Takezawa, Kenji; and Hiratani, Hajime, 4,303,650, Cl. 424-177.000.
Hirsch, Peter; Wubbels, Bernhard; and Schafer, Rolf, to Eichhorn, Friedrich. Apparatus for welding steel sheets. 4,303,822, Cl. 219-73.100.
Hirsch, Selwyn R.: *See—*
Manfredo, Joseph N.; and Hirsch, Selwyn R., 4,303,052, Cl. 123-563.000.
Hisamoto, Iwao; Maeda, Chiaki; Esaka, Takasige; and Nishiwaki, Mitsuhiro, to Daikin Kogyo Co., Ltd. Foam fire-extinguishing composition and preparation and use thereof. 4,303,534, Cl. 252-3.000.
Hisano, Katsukuni; Isa, Hitoshi; and Sibaoka, Hazime, to Hitachi, Ltd. Method of and system for controlling stress produced in steam turbine rotor. 4,303,369, Cl. 415-1.000.
Hitachi Chemical Company, Ltd.: *See—*
Sudo, Ryoichi; Okunaka, Masaaki; Yokono, Hitoshi; Isogai, Tokio; and Yamazaki, Mitsuo, 4,303,554, Cl. 252-518.000.
Hitachi, Ltd.: *See—*
Fujita, Masahiko; Hayashi, Kenji; and Konno, Kazutoshi, 4,303,210, Cl. 242-200.000.
Hisano, Katsukuni; Isa, Hitoshi; and Sibaoka, Hazime, 4,303,369, Cl. 415-1.000.
Kato, Kanji; and Tanisaka, Satoshi, 4,303,979, Cl. 364-485.000.
Kuwabara, Takao; Uchiyama, Hisaya; and Okumura, Hiroshi, 4,303,370, Cl. 415-17.000.

Matsuoka, Yoshitaka; Shimazoe, Michitaka; Yamamoto, Yoshimi; Ai, Mitsuo; Miyauchi, Keiji; Nemoto, Hideyuki; Tsuchiya, Masatoshi; and Tanabe, Masanori. 4,303,903, Cl. 338-4.000.

Miyazawa, Osamu; Oka, Hitoshi; Tanaka, Isamu; Matsuo, Akira; Yokono, Hitoshi; Nakagawa, Nobuo; and Isogai, Tokio. 4,303,443, Cl. 106-1.230.

Nagao, Masato; Ito, Yoshiyasu; Wase, Keizou; Kazawa, Yoshiaki; and Fujinaga, Takamasa. 4,303,473, Cl. 376-150.000.

Nakamura, Kiyoshi; Isaka, Masayoshi; Kurotaki, Yoshimi; and Suzuki, Yutaka. 4,303,870, Cl. 318-135.000.

Sudo, Ryoichi; Okunaka, Masaaki; Yokono, Hitoshi; Isogai, Tokio; and Yamazaki, Mitsuo. 4,303,554, Cl. 252-518.000.

Hoeberechts, Arthur M. E.: *See*—
Van Gorkom, Gerardus G. P.; and Hoeberechts, Arthur M. E., 4,303,930, Cl. 357-13.000.

Hoechst Aktiengesellschaft: *See*—
Bauer, Gunther; Burghardt, Wolfgang; and Moller, Hilmar, 4,302,929, Cl. 57-247.000.

Gebhardt, Dieter; Crass, Gunther; and Janocha, Siegfried, 4,303,708, Cl. 428-35.000.

Kuhne, Gerhard, 4,303,593, Cl. 260-544.00F.

Hoehn, Marvin M.: *See*—
Hamill, Robert L.; and Hoehn, Marvin M., 4,303,647, Cl. 424-121.000.

Hoffend, Donald A., Jr.; and Cristy, Nicholas G. Arrangement for supporting theatrical equipment. 4,303,237, Cl. 272-22.000.

Hoffman, Robert. Optical micrometer measuring system. 4,303,340, Cl. 356-372.000.

Hogenson, Peter A.: *See*—
Hamermesh, Charles L.; Tung, Chiang-Ying M.; and Hogenson, Peter A., 4,303,727, Cl. 428-314.000.

Hogsett, Robert F.: *See*—
Huggins, Dale K.; Queneau, Paul B.; Ziegler, Robert C.; Beckstead, Leo W.; and Hogsett, Robert F., 4,303,623, Cl. 423-55.000.

Hogue, Marcus P.; and Frisbee, Gregory A., to General Electric Company. Luminaire. 4,303,971, Cl. 362-297.000.

Hoisington, David B., to United States of America, Navy. Method for reducing errors due to source amplitude modulation in a sequential amplitude comparison direction finding system. 4,303,922, Cl. 343-114.000.

Hojo, Makoto: *See*—
Tsunekawa, Shinichi; and Hojo, Makoto, 4,303,290, Cl. 316-20.000.

Hokkai Can Co., Ltd.: *See*—
Takahashi, Yuzo; Maeda, Yoshinari; Tanaka, Yasuyuki; Nagai, Kastumi; and Oyama, Shiro, 4,303,032, Cl. 113-116.0QA.

Hollingsead International, Inc.: *See*—
Hollingsead, Robert A., 4,303,216, Cl. 248-74.0PB.

Hollingsead, Robert A., to Hollingsead International, Inc. Releasable clamp assembly. 4,303,216, Cl. 248-74.0PB.

Hollis, John W., Jr.; and Schoenherr, Michael W., to American Can Company. Lignin-containing resin adhesive. 4,303,562, Cl. 260-17.500.

Hollymatic Corporation: *See*—
Wagner, Richard C., 4,302,868, Cl. 17-32.000.

Holmer, Donald A.: *See*—
Ridgway, James S.; Holmer, Donald A.; and Pickett, Oscar A., Jr., 4,303,577, Cl. 260-45.75C.

Holmer, Erik Y.: *See*—
Lindahl, Ulf P. F.; Backstrom, Gudrun E.; Thunberg, John Y. L.; Fransson, Lars-Ake; Andersson, Lars-Olov; Holmer, Erik Y.; Sandberg, Inga H.; and Soderstrom, Ewa G., 4,303,651, Cl. 424-183.000.

Holt, Peter J.: *See*—
Andriessen, Ronald C.; and Holt, Peter J., 4,302,958, Cl. 72-71.000.

Holzwarth, Dietmar H. Tire chain. 4,303,116, Cl. 152-224.000.

Honeywell Inc.: *See*—
Black, Robert A.; and Peterson, Gary A., 4,303,383, Cl. 431-31.000.

Hawkins, Royal R., 4,303,873, Cl. 318-301.000.

Houvig, Felix J., 4,303,984, Cl. 364-571.000.

Mueller, Dale A.; and Serber, Stephen L., 4,302,947, Cl. 62-155.000.

Honeywell Information Systems Inc.: *See*—
Panepinto, William, Jr.; and Nibby, Chester M., Jr., 4,303,993, Cl. 365-230.000.

Hope, William K., Sr., to H H & F Enterprises. Shock-absorbing thermoplastic support for rotating spinning ring. 4,302,927, Cl. 57-122.000.

Horikoshi, Koki; Yamamoto, Mikio; Nakamura, Nobuyuki; and Kawano, Masanobu, to Rikagaku Kenkyusho; and Nihon Shokuhini Kako Co., Ltd. Process for recovering cyclodextrins. 4,303,787, Cl. 536-103.000.

Horn, Hannes S., to Klockner-Humboldt-Deutz AG. Operating method and settling machine for processing coal. 4,303,510, Cl. 209-457.000.

Horng, Cheng T.; Poponiak, Michael R.; Rupprecht, Hans S.; and Schwenker, Robert O., to International Business Machines Corporation. Self-aligned micrometer bipolar transistor device and process. 4,303,933, Cl. 357-50.000.

Hotchkiss-Brandt Sogeme H.B.S.: *See*—
de Mimerand, Yvan de R.; and Goullet, Jean, 4,303,503, Cl. 209-3.300.

Hotz, Walter: *See*—
Porro, Francesco; Gabriele, Cosimo; and Hotz, Walter, 4,303,866, Cl. 250-442.000.

Houdek, Ladd E.; Cespino, Frank G.; and Yezbick, Patrick A., to Ford Motor Company. Method for producing foamed composite panels and resultant product. 4,303,728, Cl. 428-315.000.

Houle, Rene C. Reinforced fiberboard pallet. 4,303,020, Cl. 108-51.300.

Houston, Robert L., to Owens-Corning Fiberglas Corporation. Method and apparatus for forming mineral fibers. 4,303,430, Cl. 65-6.000.

Houvig, Felix J., to Honeywell Inc. Sensor output correction circuit. 4,303,984, Cl. 364-571.000.

Howard, Arthur G. Air treatment apparatus. 4,303,420, Cl. 55-242.000.

Howard, John R.: *See*—
Machacek, Robert W.; Nichols, Charles E.; and Howard, John R., 4,302,862, Cl. 15-117.000.

Howe, Robert K.; and Lee, Len F., to Monsanto Company. 2-Substituted-4-alkyl or trihaloalkyl-5-oxazolecarboxylic acids as safening agents. 4,303,439, Cl. 71-88.000.

Hoya Corporation: *See*—
Yamashita, Toshiharu, 4,303,298, Cl. 350-1.100.

Huckins, James N.; Stalling, David L.; Petty, Jimmie D.; and Smith, Lawrence M., to United States of America, Interior. Multi-chromatographic materials. 4,303,529, Cl. 210-635.000.

Hudson Wire Company: *See*—
Burke, Richard E.; and Harris, Edward H., 4,303,387, Cl. 432-72.000.

Huffstutler, Miles C., Jr.: *See*—
Shah, Suresh T.; Huffstutler, Miles C., Jr.; and Bentzen, Bruce D., 4,303,530, Cl. 210-651.000.

Huggins, Dale K.; Beckstead, Leo W.; and Queneau, Paul B., to Amax Inc. Chemical treatment of low-grade wolframite concentrate having high $Mo/WO_3$ ratio. 4,303,622, Cl. 423-55.000.

Huggins, Dale K.; Queneau, Paul B.; Ziegler, Robert C.; Beckstead, Leo W.; and Hogsett, Robert F., to Amax Inc. Separation of trace molybdenum from tungstate solutions. 4,303,623, Cl. 423-55.000.

Hughes Aircraft Company: *See*—
Schmitz, Lawrence S., 4,303,996, Cl. 368-82.000.

Wittmann, Alois; and Rubin, Charles P., 4,303,214, Cl. 244-158.00R.

Hugley, Dale G. Hose ending and method of forming same. 4,303,102, Cl. 138-96.00R.

Hulick, Timothy P. Remote control digitally encoded electronic switch. 4,303,911, Cl. 340-825.690.

Hunt, David J., to International Computers Limited. Data processing system with error checking. 4,304,002, Cl. 371-49.000.

Hunter Engineering Company: *See*—
Lewis, William R.; Smith, Dennis M.; and Jenness, Wendell G., 4,303,181, Cl. 222-591.000.

Hunter, John, to Thomsen Equipment Company. Concrete pump. 4,303,378, Cl. 417-517.000.

Hureau, Jacques; Hureau, Jean-Claude; and Gaillard, Hubert. Process for extruding a thermoplastic sheath in the form of a tubular film provided with perforations and device for carrying out the process. 4,303,609, Cl. 264-504.000.

Hureau, Jean-Claude: *See*—
Hureau, Jacques; Hureau, Jean-Claude; and Gaillard, Hubert, 4,303,609, Cl. 264-504.000.

Hurn, Edwin J.; and Kissinger, John A., to General Atomic Company. Nuclear reactor system with aligned feedwater and superheater penetrations. 4,303,475, Cl. 376-394.000.

Hutchens, James O.: *See*—
Swanson, Rodney C.; and Hutchens, James O., 4,303,254, Cl. 280-43.200.

Ibraham, Fayez F.; Subera, Elmer; and deBruyn, William, to Tyler Refrigeration Corporation. Refrigerated display case having a unitary outlet grid. 4,302,948, Cl. 62-256.000.

Ibrahim, Fayez F., to Tyler Refrigeration Corporation. Refrigeration system using air defrost. 4,302,946, Cl. 62-82.000.

Ichihara, Fumio: *See*—
Kishino, Takao; Ichihara, Fumio; and Yamaguchi, Nobuo, 4,303,917, Cl. 340-772.000.

Ichikawa, Toshiji; and Watanabe, Teruko, to Terumo Corporation. Syringe. 4,303,070, Cl. 128-218.00P.

Ichikawa, Yataro: *See*—
Ono, Syoji; Sugiyama, Takashi; Kawakami, Yoshiko; Ichikawa, Yataro; Suzuki, Yoji; Ohmori, Hitoshi; and Azuma, Akiko, 4,303,664, Cl. 424-271.000.

Ida, Masaru: *See*—
Yokoyama, Kenji; and Ida, Masaru, 4,303,889, Cl. 330-107.000.

Idel, Karsten; and Merten, Josef, to Bayer Aktiengesellschaft. Process for the preparation of polyarylene sulphides. 4,303,781, Cl. 528-388.000.

Ifo Sanitar Aktiebolag Simrishamnsfabriken: *See*—
Berggren, Tony, 4,303,272, Cl. 297-153.000.

Igarashi, Hideo: *See*—
Sano, Kozo; Igarashi, Hideo; and Ikarashi, Takeo, 4,303,630, Cl. 423-415.00A.

IHC Holland N.V.: *See*—
van den Elshout, Johannes; and Asselbergs, Jan, 4,302,893, Cl. 37-66.000.

Iino, Toshio, to Daiwa Can Company, Limited. Apparatus for blanking metal sheet having parts of welded connection. 4,302,995, Cl. 83-104.000.

Ikarashi, Takeo: *See*—
Sano, Kozo; Igarashi, Hideo; and Ikarashi, Takeo, 4,303,630, Cl. 423-415.00A.

Ikeura, Kenji; Saito, Masaaki; Yamane, Michiyoshi; Sanbuichi, Hiroshi; and Isobe, Akio. Coarse and fine air supply control for closed-loop controlled carbureted internal combustion engines. 4,303,049, Cl. 123-440.000.

Ikoma, Mituga: *See*—
Shimura, Naohiko; Shinada, Takeo; Ikoma, Mituga; and Nakashima, Hisao, 4,303,688, Cl. 426-513.000.

Ilin, Nikolai P.: *See*—
Bagdasarov, Khachik S.; Khaimov-Malkov, Valentin Y.; Ilin, Nikolai P.; Starostin, Jury A.; Fedorov, Evgeny A.; and Sedakov, Nikolai I., 4,303,465, Cl. 156-616.00R.

Illy, Alois, to Klein, Schanzlin & Becker Aktiengesellschaft. Seal for a plate-shaped closure. 4,303,249, Cl. 277-152.000.

Imai, Toshihiro; and Takase, Hiroshi, to Olympus Optical Co., Ltd. Photographic lens system. 4,303,313, Cl. 350-456.000.

Imai, Toshihiro; and Yamada, Toyotaka, to Olympus Optical Company Ltd. Focus correcting device for use in a rangefinder camera. 4,303,323, Cl. 354-166.000.

Imperial Chemical Industries Limited: *See*—
Flynn, Anthony P., 4,303,666, Cl. 424-273.00B.
Hey, David G., 4,303,558, Cl. 252-548.000.
Jones, Geraint, 4,303,649, Cl. 424-177.000.

Inacker, Otto; and Sessler, Berthold, to Dornier-System GmbH. Apparatus for indicating the loading on an ion exchanger with respect to a specific metal or group of metals. 4,303,512, Cl. 210-93.000.

Inoue, Isamu; Minamide, Seiko; and Okuda, Makoto, to Matsushita Electric Industrial Co., Ltd.,. Automatic thermoluminescence dosimetric system. 4,303,857, Cl. 250-328.000.

Institut Merieux: *See*—
Tayot, Jean-Louis; and Mynard, Marie-Claude, 4,303,638, Cl. 424-32.000.

Institute of Gas Technology: *See*—
Pangborn, Jon B., 4,303,121, Cl. 165-1.000.

International Business Machines Corporation: *See*—
Bapst, Urs H.; Gfeller, Fritz; and Vettiger, Peter, 4,303,855, Cl. 250-226.000.
Barkley, Keith G.; Ghafghaichi, Majid; Gopalakrishna, Yelandur R.; and Tzou, Albert J., 4,303,992, Cl. 365-51.000.
Blanck, Thomas W., 4,303,929, Cl. 346-140.00R.
Brownlow, James M., 4,303,547, Cl. 252-301.40F.
Buhne, Joachim; Schafer, Rolf; and Stoffel, Axel, 4,303,482, Cl. 204-129.300.
Cutler, Robert S.; and Lindquist, Robert M., 4,303,545, Cl. 252-174.210.
Gini, Donald; Larson, Theodore L.; Merten, Ronald A.; and Simonetti, Alex, 4,303,738, Cl. 428-423.100.
Harbour, Wilmer P., Jr.; and Heard, Roderick S., 4,303,925, Cl. 346-1.100.
Horng, Cheng T.; Poponiak, Michael R.; Rupprecht, Hans S.; and Schwenker, Robert O., 4,303,933, Cl. 357-50.000.
Tsao, Sherman H., 4,303,927, Cl. 346-75.000.

International Computers Limited: *See*—
Hunt, David J., 4,304,002, Cl. 371-49.000.

International Flavors & Fragrances Inc.: *See*—
Boden, Richard M.; Dekker, Lambert; Schmitt, Frederick L.; and Van Loveren, Augustinus G., 4,303,555, Cl. 252-522.00R.
Sprecker, Mark A.; Schmitt, Frederick L.; Vock, Manfred H.; Vinals, Joaquin F.; and Kiwala, Jacob, 4,303,725, Cl. 428-291.000.

International Jensen Incorporated: *See*—
Urban, Keith F., 4,303,142, Cl. 181-144.000.

International Minerals & Chemical Corp.: *See*—
Young, Vernon V.; Williams, Robert D.; and Ivy, Richard E., 4,303,657, Cl. 424-250.000.

International Moorings & Marine, Inc.: *See*—
Helveston, Wilton L.; and Pecoraro, Richard J., 4,303,037, Cl. 114-230.000.

International Paper Company: *See*—
DiNovo, Salvatore T.; and Ballantyne, Wayne E., 4,303,469, Cl. 162-30.00R.

International Standard Electric Corporation: *See*—
Oswald, Thomas, 4,303,808, Cl. 179-175.30F.

International Wire Products Company, a Division of Carlisle Corporation: *See*—
Faulstich, Gerhard H., 4,302,924, Cl. 57-58.520.

Internationale Octrooi Maatschappij "OCTROPA": *See*—
Challen, Ian A.; East, Sandra; and Sanderson, George R., 4,303,681, Cl. 426-92.000.

InterVet, Inc.: *See*—
Vars, Charles A., 4,303,062, Cl. 128-1.300.

IPCO Corporation: *See*—
Weissman, Bernard, 4,303,391, Cl. 433-76.000.

Irby, Holcomb B. Magnetic ball thrust bearing. 4,303,281, Cl. 308-10.000.

IRD Mechanalysis, Inc.: *See*—
Sisson, Edwin D.; and Spehr, Carl J., 4,302,977, Cl. 73-658.000.

Irvin, Ronald D., to Quaker Oats Company, The. Releasable hinge for swingable portions of a container. 4,302,866, Cl. 16-171.000.

Irvin, Ronald D., to Quaker Oats Company, The. Phonograph having an improved tone arm assembly. 4,303,999, Cl. 369-75.000.

Isa, Hitoshi: *See*—
Hisano, Katsukuni; Isa, Hitoshi; and Sibaoka, Hazime, 4,303,369, Cl. 415-1.000.

Isaka, Masayoshi: *See*—
Nakamura, Kiyoshi; Isaka, Masayoshi; Kurotaki, Yoshimi; and Suzuki, Yutaka, 4,303,870, Cl. 318-135.000.

Ishihara, Takeshi; and Kojima, Masaru, to NGK Insulators Ltd. Insulator comprising a holding metal fitting and a fiber reinforced plastic rod held in the sleeve of the metal fitting under pressure. 4,303,799, Cl. 174-176.000.

Ishikawa, Yuho, to Sony Corporation. Push button switch assembly. 4,303,815, Cl. 200-330.000.

Ishitobi, Kaoru: *See*—
Ogawa, Yasunao; and Ishitobi, Kaoru, 4,303,409, Cl. 23-230.00B.

Isobe, Akio: *See*—
Ikeura, Kenji; Saito, Masaaki; Yamane, Michiyoshi; Sanbuichi, Hiroshi; and Isobe, Akio, 4,303,049, Cl. 123-440.000.

Isogai, Tokio: *See*—
Miyazawa, Osamu; Oka, Hitoshi; Tanaka, Isamu; Matsuo, Akira; Yokono, Hitoshi; Nakagawa, Nobuo; and Isogai, Tokio, 4,303,443, Cl. 106-1.230.
Sudo, Ryoichi; Okunaka, Masaaki; Yokono, Hitoshi; Isogai, Tokio; and Yamazaki, Mitsuo, 4,303,554, Cl. 252-518.000.

Isono, Tadao, to Osawa Precision Industries, Ltd. Automatic focus adjusting device. 4,303,320, Cl. 354-25.000.

Itakura, Takahiro: *See*—
Uemura, Tamio; Ito, Yoshimasa; and Itakura, Takahiro, 4,303,027, Cl. 112-121.260.

Ito, Yoshimasa: *See*—
Uemura, Tamio; Ito, Yoshimasa; and Itakura, Takahiro, 4,303,027, Cl. 112-121.260.

Ito, Yoshiyasu: *See*—
Nagao, Masato; Ito, Yoshiyasu; Wase, Keizou; Kazawa, Yoshiaki; and Fujinaga, Takamasa, 4,303,473, Cl. 376-150.000.

ITT Industries, Inc.: *See*—
Achtstaetter, Gerhard, 4,303,891, Cl. 330-260.000.

Ivakhnenko, Viktor V.: *See*—
Kuznetsov, Andrei L.; Sudarev, Anatoly V.; Ivakhnenko, Viktor V.; Lamm, Jury A.; Maev, Vladimir A.; and Zakharov, Jury I., 4,302,932, Cl. 60-39.320.

Ivankov, Vasily A.: *See*—
Yakovlev, Vladimir K.; Lugovoi, Elektron P.; and Ivankov, Vasily A., 4,302,959, Cl. 72-138.000.

Ivy, Richard E.: *See*—
Young, Vernon V.; Williams, Robert D.; and Ivy, Richard E., 4,303,657, Cl. 424-250.000.

Iwagami, Fusao: *See*—
Sugiyama, Kiyoshi; Matsuba, Masaharu; Iwagami, Fusao; and Fukumoto, Khoki, 4,303,928, Cl. 346-75.000.

Iwai, Ryuichiro, to Matsushita Electric Industrial Co., Ltd. Motor speed control system. 4,303,874, Cl. 318-331.000.

Iwasaki, Ryuichi, to Akebono Brake Industry Company, Ltd. Single piston-cylinder duo-servo drum brake. 4,303,148, Cl. 188-331.000.

Iyama, Yukio; Fujita, Masao; and Higashiiriki, Nobuhiro, to Nippon Mining Company Limited. Mechanical punching device for punching the tuyeres of a converter. 4,303,229, Cl. 266-135.000.

Izura, Keiko, heir: *See*—
Tsuboka, Eiichi; Maehara, Fumio; Fujita, Hiroshi; Izura, Yoshiteru, deceased; and Izura, Keiko, heir, 4,303,988, Cl. 364-900.000.

Izura, Yoshiteru, deceased: *See*—
Tsuboka, Eiichi; Maehara, Fumio; Fujita, Hiroshi; Izura, Yoshiteru, deceased; and Izura, Keiko, heir, 4,303,988, Cl. 364-900.000.

J. E. Hanger & Company Limited: *See*—
May, Denis R. W., 4,302,856, Cl. 3-30.000.

Jack Prince, Inc.: *See*—
Prince, Jack A.; Abernathy, L. Wayne; and Caylor, L. Justin, 4,303,206, Cl. 241-24.000.

Jackson, Roy J., to Shell Oil Company. Vinyl ester resins having improved color. 4,303,579, Cl. 260-45.95E.

Jackson, Roy J., Jr., to Shell Oil Company. Stabilized polyester compositions. 4,303,576, Cl. 260-45.9QB.

James, Bobby D.; Simpson, Ronald O.; and Starling, J. David, to Coulter Electronics, Inc. Apparatus for determining hemoglobin and white blood cell count in blood. 4,303,337, Cl. 356-72.000.

Janeczko, John T.: *See*—
Cayen, Donald J.; and Janeczko, John T., 4,303,360, Cl. 409-233.000.

Janocha, Siegfried: *See*—
Gebhardt, Dieter; Crass, Gunther; and Janocha, Siegfried, 4,303,708, Cl. 428-35.000.

Janome Sewing Machine Co., Ltd.: *See*—
Takenoya, Hideaki; and Makabe, Hachiro, 4,303,028, Cl. 112-158.00E.

Jansen, Deborah S.; and Puydak, Robert C., to Exxon Research & Engineering Co. Film-forming thermoplastic elastomeric polymer compositions. 4,303,571, Cl. 260-33.6AQ.

Japan Chemical Research Co., Ltd.: *See*—
Takezawa, Kenji; and Hiratani, Hajime, 4,303,650, Cl. 424-177.000.

Japan Nuclear Ship Research and Development Agency: *See*—
Aoki, Susumu; Asaumi, Hirosi; Take, Shigeo; Miyakoshi, Junichi; Takemoto, Hiroshi; and Kabayama, Kenta, 4,303,553, Cl. 252-478.000.

Jarmell, Solomon; and Rodgers, Barry E., to Fisher Scientific Company. Crucible with lid. 4,303,615, Cl. 422-102.000.

Jaronen, Niilo. Portable electric heating device for thawing motor vehicle door locks. 4,303,825, Cl. 219-201.000.

Jarrige, Guy; and Reiniche, Andre, to Compagnie Generale des Etablissements Michelin. Process for cooling a metal wire obtained from a liquid jet. 4,303,119, Cl. 164-462.000.

Jenness, Wendell G.: *See*—
Lewis, William R.; Smith, Dennis M.; and Jenness, Wendell G., 4,303,181, Cl. 222-591.000.

Jerry Johnson Mill Construction, Inc.: *See*—
Johnson, Jerry, 4,302,887, Cl. 34-13.800.

Jesse, Peter: *See*—
Wolber, Robert; Maurer, Roland; and Jesse, Peter, 4,303,962, Cl. 361-399.000.

Jessee, Ralph D.: *See—*
Stacey, Eric J.; Baker, Donal E.; Doughman, Charles L.; and Jessee, Ralph D., 4,303,972, Cl. 363-10.000.
Jessop, Thomas C., to Eastman Kodak Company. Analyzer apparatus featuring a simplified incubator. 4,303,611, Cl. 422-65.000.
Jizodo, Yozo: *See—*
Kawabe, Hidehiko; Yoshino, Yozo; and Jizodo, Yozo, 4,302,906, Cl. 47-62.000.
Joby, Michael J., to Lucas Industries, Ltd. Fuel control for a multi-engine gas turbine installation. 4,303,976, Cl. 364-431.000.
Johannsen, Rolf, to Siemens Aktiengesellschaft. Lateral transistor free of parisitics. 4,303,932, Cl. 357-48.000.
Johansen, Hans A.; Phillippi, Larry R.; and Green, Edward A., to Eaton Corporation. Method of making a semi-conductive paint hose. 4,303,457, Cl. 156-149.000.
John Finlay (Engineering) Limited: *See—*
Finlay, John A., 4,303,506, Cl. 209-247.000.
Johnson, Avery R.; and Harrison, John M., to Small World Exchange, Inc. Telephone-conferencing apparatus and method having line location. 4,303,804, Cl. 179-18.0BC.
Johnson Controls, Inc.: *See—*
Rudich, George, Jr.; and Matthews, Russell B., 4,303,385, Cl. 431-70.000.
Johnson, Everett A.: *See—*
Silverman, Daniel; and Johnson, Everett A., 4,303,852, Cl. 235-382.000.
Johnson, Jerry, to Jerry Johnson Mill Construction, Inc. Veneer block moisturizing apparatus. 4,302,887, Cl. 34-13.800.
Johnson & Johnson Baby Products Company: *See—*
Mesek, Frederick K., 4,302,853, Cl. 2-402.000.
Johnson, Richard E.: *See—*
Sand, Ralph E.; and Johnson, Richard E., 4,303,691, Cl. 426-573.000.
Johnson, Sigurd A., to Plan Hold Corporation. Index guide means for a filing system. 4,303,284, Cl. 312-189.000.
Johnson, Timothy W.; and O'Shaughnessy, Marion T., to Phillips Petroleum Company. Viscometer. 4,302,965, Cl. 73-55.000.
Jones, Francis W.; Mayfield, Robert J.; and O'Loughlin, Gary J., to Commonwealth Scientific and Industrial Research Organization. Fiber-reactive phosphorus mothproofing agents. 4,303,652, Cl. 424-200.000.
Jones, Frank W.; and Mielnicki, Joseph, to Alco Foodservice Equipment Company. Guarded tomato slicer. 4,302,997, Cl. 83-425.300.
Jones, Geraint, to Imperial Chemical Industries Limited. 1-Phenyl-2-aminoethanol derivatives. 4,303,649, Cl. 424-177.000.
Jones, Kenneth J., to Lucas Industries Limited. Reflex reflector device. 4,303,305, Cl. 350-103.000.
Jones, Leslie A.: *See—*
Haskew, Francis A.; and Jones, Leslie A., 4,303,275, Cl. 299-31.000.
Jones, Raymond D.: *See—*
Roberts, Charles A.; and Jones, Raymond D., 4,303,959, Cl. 361-124.000.
Joung, John J., to American Hospital Supply Corporation. Hypoallergenic slip resistant gloves and methods of making same. 4,302,852, Cl. 2-167.000.
Joy Manufacturing Company: *See—*
Coe, Everett L., Jr., 4,303,418, Cl. 55-145.000.
Weber, William J., 4,303,132, Cl. 173-147.000.
Joyce, William R.: *See—*
Wiley, Thomas W.; and Joyce, William R., 4,303,189, Cl. 226-15.000.
Juhasz, John E.; and Krass, James E., Jr., to Rockwell International Corporation. Real time clock using computer and separate counting means. 4,303,850, Cl. 235-92.0FP.
Jung, Werner; and Oswald, Jack, to Foundry Design Corp. Method and apparatus for removing sand from castings. 4,303,453, Cl. 134-10.000.
Juriev, Leonid A.: *See—*
Maslakov, Petr A.; Klushin, Nikolai A.; Juriev, Leonid A.; Kokarev, Vladimir I.; Kilin, Viktor E.; Galimov, Anas G.; Sutyagin, Oleg Y.; and Yankovsky, Oleg A., 4,303,002, Cl. 91-225.000.
Kabayama, Kenta: *See—*
Aoki, Susumu; Asaumi, Hirosi; Take, Shigeo; Miyakoshi, Junichi; Takemoto, Hiroshi; and Kabayama, Kenta, 4,303,553, Cl. 252-478.000.
Kabel-und Metallwerke Gutehoffnungshuette AG: *See—*
Rohner, Peter, 4,303,105, Cl. 138-149.000.
Kabi AB: *See—*
Lindahl, Ulf P. F.; Backstrom, Gudrun E.; Thunberg, John Y. L.; Fransson, Lars-Ake; Andersson, Lars-Olov; Holmer, Erik Y.; Sandberg, Inga H.; and Soderstrom, Ewa G., 4,303,651, Cl. 424-183.000.
Kabushiki Kaisha Suwa Seikosha: *See—*
Aizawa, Hitomi, 4,303,995, Cl. 368-28.000.
Shimodaira, Tadayoshi, 4,303,013, Cl. 101-99.000.
Kabushiki Kaisha Taada: *See—*
Sumiyoshi, Tateo, 4,303,042, Cl. 122-17.000.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
Yoshida, Kazunori; Suzuki, Fuzio; Arakawa, Hiroshi; and Kobayashi, Takeshi, 4,303,106, Cl. 139-435.000.
Kabushiki Kaisha Toyota Chou Kenkyusho: *See—*
Yoshida, Kazunori; Suzuki, Fuzio; Arakawa, Hiroshi; and Kobayashi, Takeshi, 4,303,106, Cl. 139-435.000.
Kahl, Horst: *See—*
Hertell, Siegfried; Kirchherr, Claus; and Kahl, Horst, 4,303,091, Cl. 137-117.000.
Kajimura, Mutsuhiko; and Sasaki, Hideaki, to Sekisui Kaseihin Kogyo Kabushiki Kaisha. Process for producing expandable thermoplastic resin beads. 4,303,756, Cl. 521-59.000.
Kajimura, Mutsuhiko; and Sasaki, Hideaki, to Sekisui Kaseihin Kogyo Kabushiki Kaisha. Process for producing expandable thermoplastic resin beads using polypropylene as nucleus. 4,303,757, Cl. 521-59.000.
Kakizawa, Toshio; and Sakai, Itsuo, to Tokyo Shibaura Denki Kabushiki Kaisha. Apparatus controlled by a microprocessor. 4,304,003, Cl. 371-62.000.
Kalb, Gerald F., to Geosource Inc. Kelly valve. 4,303,100, Cl. 137-853.000.
Kalinowski, Robert E.; and Vincent, Gary A., to Dow Corning Corporation. Transparent thermoplastics containing organosilicon compounds. 4,303,566, Cl. 260-29.1SB.
Kamada, Hiroshi: *See—*
Hakaridani, Mitsuhiro; Kamada, Hiroshi; Suzuki, Hitoshi; and Osaki, Mikio, 4,303,916, Cl. 340-712.000.
Kamei, Shun: *See—*
Shimazaki, Tetsuro; and Kamei, Shun, 4,303,548, Cl. 252-316.000.
Kamiya, Akihiro: *See—*
Shimizu, Kenichi; Kamiya, Akihiro; Yamazaki, Shu; Akiyama, Riozo; Makuuchi, Teruji; and Yoshizaki, Shiichiro, 4,303,848, Cl. 313-346.00R.
Kamiya, Takashi; Tanaka, Kunihiko; Nakai, Yoshiharu; and Sakane, Kazuo, to Fujisawa Pharmaceutical Co., Ltd. 3,7-Disubstituted-3-cephem-4-carboxylic acid compounds. 4,303,655, Cl. 424-246.000.
Kamyr Aktiebolag: *See—*
Skretting, Arne, 4,303,508, Cl. 209-297.000.
Kanazawa, Nobuo: *See—*
Nakayama, Masaharu; Matsushima, Masaru; Banno, Shigeki; and Kanazawa, Nobuo, 4,303,762, Cl. 525-299.000.
Kangas, Donald A., to Dow Chemical Company, The. Stable insecticide containing latexes, method of making and method of distributing insecticide. 4,303,642, Cl. 424-78.000.
Kano, Tokio; and Tamagawa, Akira, to Olympus Optical Co. Ltd. Agglutination analyzing vessel. 4,303,616, Cl. 422-102.000.
Kanzaki Kokyukoki Mfg. Co., Ltd.: *See—*
Yano, Kazuhiko; and Ohtsuki, Kazuhiko, 4,303,400, Cl. 440-75.000.
Kapadia, Uday S.; and Logioco, John W., to Bell Telephone Laboratories, Incorporated. Self-locking switch contact member. 4,303,812, Cl. 200-6.00R.
Kaplan, Harold: *See—*
McMorrow, John J.; Kaplan, Harold; and Sommerhalter, Frederick, Jr., 4,302,956, Cl. 70-312.000.
Karl Mayer Textilmaschinenfabrik GmbH: *See—*
Wilkens, Christian, 4,302,953, Cl. 66-87.000.
Karol, Frederick J.: *See—*
Wagner, Burkhard E.; Goeke, George L.; and Karol, Frederick J., 4,303,771, Cl. 526-125.000.
Karr, Gerald W., to Beloit Corporation. Roll wrapper header apparatus. 4,303,462, Cl. 156-538.000.
Kasamatsu, Kiyoshi: *See—*
Hirano, Masachika; Ohsumi, Tadashi; Kasamatsu, Kiyoshi; and Kato, Takashi, 4,303,672, Cl. 424-304.000.
Kasuga, Toshishige: *See—*
Campbell, George T. R.; Ohno, Kosaku; and Kasuga, Toshishige, 4,303,166, Cl. 212-233.000.
Kataoka, Hiroyuki: *See—*
Arai, Yoshio; Kataoka, Hiroyuki; Suzuki, Isao; and Yokota, Shozo, 4,303,948, Cl. 358-287.000.
Katayama, Nobuaki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Roller bearing assembly. 4,302,984, Cl. 74-375.000.
Kato, Kanji; and Tanisaka, Satoshi, to Hitachi, Ltd. Frequency spectrum variation monitoring system. 4,303,979, Cl. 364-485.000.
Kato, Ryo: *See—*
Ogasa, Katsuhiro; Kuboyama, Morio; Kuwahara, Kunisuke; Kato, Ryo; and Shimada, Hiroshi, 4,303,678, Cl. 426-46.000.
Kato, Takashi: *See—*
Hirano, Masachika; Ohsumi, Tadashi; Kasamatsu, Kiyoshi; and Kato, Takashi, 4,303,672, Cl. 424-304.000.
Katoh, Noboru; Komatsu, Kazumiya; and Nozaki, Hisashi, to Kibun Company Limited. Method of producing minced fish meat. 4,303,685, Cl. 426-332.000.
Katsume, Hide. Full jacket-worm centrifuge. 4,303,192, Cl. 233-7.000.
Kaufman, Harold B., Jr.; and McCarthy, John P., to DCA Food Industries, Inc. Bottom entry oven. 4,303,819, Cl. 219-10.55R.
Kawabata, Nariyoshi; and Yasuda, Sinichi, to Koei Chemical Co., Ltd. Method for adsorbing and recovering phenols. 4,303,531, Cl. 210-663.000.
Kawabe, Hidehiko; Yoshino, Yozo; and Jizodo, Yozo, to Matsushita Electric Industrial Co., Ltd. Soilless culture device. 4,302,906, Cl. 47-62.000.
Kawakami, Shigeru. Bicycle lock. 4,302,955, Cl. 70-30.000.
Kawakami, Yoshiko: *See—*
Ono, Syoji; Sugiyama, Takashi; Kawakami, Yoshiko; Ichikawa, Yataro; Suzuki, Yoji; Ohmori, Hitoshi; and Azuma, Akiko, 4,303,664, Cl. 424-271.000.
Kawano, Masanobu: *See—*
Horikoshi, Koki; Yamamoto, Mikio; Nakamura, Nobuyuki; and Kawano, Masanobu, 4,303,787, Cl. 536-103.000.
Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Fukui, Jun; Niwa, Senji; Kawashima, Norihiro; Ueshima, Kenro; and Shimizu, Katumi, 4,303,618, Cl. 422-190.000.
Kawashima, Norihiro: *See—*
Fukui, Jun; Niwa, Senji; Kawashima, Norihiro; Ueshima, Kenro; and Shimizu, Katumi, 4,303,618, Cl. 422-190.000.

Kay, Edward L.; and Lohr, Delmar F., to Firestone Tire & Rubber Company, The. O,O-dialkyldithiophosphoryl-N-hydrocarbylthiophosphoramides. 4,303,597, Cl. 260-933.000.

Kaya, Azmi; Keyes, Marion A., IV; and Lukas, Michael P., to Babcock & Wilcox Company, The. System for the measurement and control of the heat input to a gas burner. 4,303,982, Cl. 364-550.000.

Kazawa, Yoshiaki: *See*—
Nagao, Masato; Ito, Yoshiyasu; Wase, Keizou; Kazawa, Yoshiaki; and Fujinaga, Takamasa, 4,303,473, Cl. 376-150.000.

Kehrer, Gerald P.; and Smith, William G., to Dow Corning Corporation. Base member coated with an electrically conductive silicone elastomer. 4,303,735, Cl. 428-391.000.

Kelly, Neal F.: *See*—
Campbell, John E.; and Kelly, Neal F., 4,303,751, Cl. 430-208.000.

Kelly, William T., III; and Stahl, Francis, to Union Carbide Corporation. Multi-cell battery charger. 4,303,876, Cl. 320-2.000.

Kelso, William C., Jr. Treatment of wood with water-borne preservatives. 4,303,705, Cl. 427-351.000.

Kemmner, Ulrich: *See*—
Grimm, Gerold; and Kemmner, Ulrich, 4,303,901, Cl. 335-272.000.

Kendall Co., The: *See*—
Sergeant, Timothy L.; and Thomas, Luz E., 4,303,724, Cl. 428-229.000.

Kengle, Fritz; and Young, James E., to U.S. Steel Corporation; and Customized Controls, Inc. Smoke prevention apparatus. 4,303,194, Cl. 236-15.00E.

Kennard, Frederick L., III: *See*—
Gold, Terry J.; Kennard, Frederick L., III; Kikuchi, Paul C.; and Wilhelm, Ralph V., Jr., 4,303,490, Cl. 204-192.00C.

Kerr Glass Manufacturing Corporation: *See*—
Roy, Gerald L., 4,303,168, Cl. 215-344.000.

Kervagoret, Gilbert, to Societe Anonyme DBA. Device for hydraulically assisted steering. 4,303,099, Cl. 137-625.210.

Kestenbaum, Ronald: *See*—
Rottenkolber, John, 4,303,253, Cl. 280-11.270.

Keyes, Marion A., IV: *See*—
Kaya, Azmi; Keyes, Marion A., IV; and Lukas, Michael P., 4,303,982, Cl. 364-550.000.

Khaimov-Malkov, Valentin Y.: *See*—
Bagdasarov, Khachik S.; Khaimov-Malkov, Valentin Y.; Ilin, Nikolai P.; Starostin, Jury A.; Fedorov, Evgeny A.; and Sedakov, Nikolai I., 4,303,465, Cl. 156-616.00R.

Kibun Company Limited: *See*—
Katoh, Noboru; Komatsu, Kazumiya; and Nozaki, Hisashi, 4,303,685, Cl. 426-332.000.
Shimura, Naohiko; Shinada, Takeo; Ikoma, Mituga; and Nakashima, Hisao, 4,303,688, Cl. 426-513.000.

Kiddie Products, Inc.: *See*—
Panicci, Richard L., 4,303,170, Cl. 220-70.000.

Kikuchi, Paul C.: *See*—
Gold, Terry J.; Kennard, Frederick L., III; Kikuchi, Paul C.; and Wilhelm, Ralph V., Jr., 4,303,490, Cl. 204-192.00C.

Kilin, Viktor E.: *See*—
Maslakov, Petr A.; Klushin, Nikolai A.; Juriev, Leonid A.; Kokarev, Vladimir I.; Kilin, Viktor E.; Galimov, Anas G.; Sutyagin, Oleg Y.; and Yankovsky, Oleg A., 4,303,002, Cl. 91-225.000.

Kim, Dong H.; and McCaully, Ronald J., to American Home Products Corporation. 1H,5H-[1,4]Thiazepino[4,3-a]indole-1,5-diones. 4,303,583, Cl. 260-239.30T.

Kim, Sang H.; and Spayd, Richard W., to Eastman Kodak Company. Removal of interferents in analytical assays in a two phase interferent-removal zone. 4,303,408, Cl. 23-230.00B.

Kimura, Sakae; Shimura, Masahiro; Enokida, Kenji; and Nihei, Hideharu, to Toshiba Corporation. Sintered electrode in a discharge tube. 4,303,846, Cl. 313-178.000.

Kimura, Takeo: *See*—
Minemura, Norihiro; and Kimura, Takeo, 4,303,706, Cl. 427-381.000.

King, Gary D. Portable pontoon boat. 4,303,033, Cl. 114-61.000.

Kinop International, Inc.: *See*—
Czarnecki, Adolph, 4,303,236, Cl. 272-18.000.

Kinsey, Richard R.; Halbritter, George W.; Binsley, David L.; Rasmussen, Allan E.; and Totten, Howard Q., to General Electric Company. Longitudinally flanged waveguide. 4,303,898, Cl. 333-114.000.

Kirchherr, Claus: *See*—
Hertell, Siegfried; Kirchherr, Claus; and Kahl, Horst, 4,303,091, Cl. 137-117.000.

Kishino, Takao; Ichihara, Fumio; and Yamaguchi, Nobuo, to Futaba Denshi Kogyo Kabushiki Kaisha. Fluorescent display device. 4,303,917, Cl. 340-772.000.

Kissinger, John A.: *See*—
Hurn, Edwin J.; and Kissinger, John A., 4,303,475, Cl. 376-394.000.

Kitamura, Sadafumi: *See*—
Taniguchi, Hiroshi; Yano, Osahiko; Yamamitsu, Chojuro; Kitamura, Sadafumi; and Ohtsu, Masamitsu, 4,303,950, Cl. 360-19.000.

Kitamura, Tsutomu, to Matsushita Electric Industrial Co., Ltd. Television receiver compatible with both American and European systems. 4,303,944, Cl. 358-191.100.

Kitaura, Mashio; and Yamamoto, Koji, to Minolta Camera Kabushiki Kaisha. Camera exposure time control device. 4,303,318, Cl. 354-24.000.

Kiuchi, Masayoshi; and Saito, Syuichiro, to Canon Kabushiki Kaisha. Electromagnetically driven shutter device for camera. 4,303,326, Cl. 354-234.000.

Kiwala, Jacob: *See*—
Sprecker, Mark A.; Schmitt, Frederick L.; Vock, Manfred H.; Vinals, Joaquin F.; and Kiwala, Jacob, 4,303,725, Cl. 428-291.000.

Kleber, Kurt. Method of making textured patterns on originally smooth webs of fabrics, and method of partially printing the same. 4,303,459, Cl. 156-227.000.

Klein, Dominique, to Manufacture Metallurgique de Tournus. Herringbone grain aluminum composite strip. 4,303,741, Cl. 428-611.000.

Klein, Schanzlin & Becker Aktiengesellschaft: *See*—
Illy, Alois, 4,303,249, Cl. 277-152.000.

Kleinknecht, Hans P.; and Bosenberg, Wolfram A., to RCA Corporation. Optically testing the lateral dimensions of a pattern. 4,303,341, Cl. 356-384.000.

Klemens, William: *See*—
Ticker, Arthur; Preiser, Herman S.; Klemens, William; and Drake, John L., Jr., 4,303,608, Cl. 264-40.100.

Klement, Johann; and Schnabel, Werner, to Bosch-Siemens Hausgerate GmbH. Microwave oven. 4,303,817, Cl. 219-10.55D.

Klepper, Ronald P.: *See*—
Stensel, H. David; Maier, Peter; Biesinger, Mark G.; Refling, David R.; Klepper, Ronald P.; and Maxham, John V., 4,303,516, Cl. 210-195.400.

Kling Tecs, Inc.: *See*—
Roberts, John S., 4,303,606, Cl. 264-176.00F.

Klinkwitz, Kurt: *See*—
Alf, Reinhard; and Klinkwitz, Kurt, 4,303,872, Cl. 318-257.000.

Klippel, Gottfried: *See*—
Geistert, Walter; Kramer, Ulrich; and Klippel, Gottfried, 4,303,499, Cl. 208-33.000.

Klockner-Humboldt-Deutz AG: *See*—
Horn, Hannes S., 4,303,510, Cl. 209-457.000.

Kloth, Wolfgang, to Bayerische Motoren Werke Aktiengesellschaft. Bag for a motor vehicle, especially for a motorcycle. 4,303,184, Cl. 224-32.00R.

Klushin, Nikolai A.: *See*—
Maslakov, Petr A.; Klushin, Nikolai A.; Juriev, Leonid A.; Kokarev, Vladimir I.; Kilin, Viktor E.; Galimov, Anas G.; Sutyagin, Oleg Y.; and Yankovsky, Oleg A., 4,303,002, Cl. 91-225.000.

Knackstedt, Wilhelm: *See*—
Beckmann, Rolf; and Knackstedt, Wilhelm, 4,303,739, Cl. 428-429.000.

Kneifel, Klemens; Hilgendorff, Walther; and Martens, Uwe, to GKSS-Forschungszentrum Geesthacht GmbH. Sealing frame for stacked arrangement of exchanger membranes for electrodialysis. 4,303,493, Cl. 204-301.000.

Kneitel, Dieter: *See*—
Strack, Hans; Roebke, Wolfgang; Kneitel, Dieter; and Parr, Ehrfried, 4,303,626, Cl. 423-329.000.
Strack, Hans; Roebke, Wolfgang; Kneitel, Dieter; and Parr, Ehrfried, 4,303,627, Cl. 423-329.000.
Strack, Hans; Roebke, Wolfgang; Kneitel, Dieter; and Parr, Ehrfried, 4,303,628, Cl. 423-329.000.
Strack, Hans; Roebke, Wolfgang; Kneitel, Dieter; and Parr, Ehrfried, 4,303,629, Cl. 423-329.000.

Kobashi, Mamoru; and Ogawa, Toshihisa, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method for controlling ignition energy in an internal combustion engine. 4,303,977, Cl. 364-431.000.

Kobayashi, Kazuo; and Hirai, Heima, to Chisso Corporation. Apparatus for continuously producing potassium sulfate. 4,303,619, Cl. 422-205.000.

Kobayashi, Takeshi: *See*—
Yoshida, Kazunori; Suzuki, Fuzio; Arakawa, Hiroshi; and Kobayashi, Takeshi, 4,303,106, Cl. 139-435.000.

Kobrin, Hy H. Rear view mirror. 4,303,308, Cl. 350-303.000.

Kobubu, Akio; and Tanaka, Toshio, to Agency of Industrial Science & Technology; and Ministry of International Trade and Industry. Load-sharing type magnetic head. 4,303,956, Cl. 360-123.000.

Koch, Christian: *See*—
Behrmann, Alfred; Gottschlich, Herbert; Koch, Christian; and Abel, Otto, 4,303,495, Cl. 208-8.0LE.

Koch, Friedrich: *See*—
Goessler, Gerhard; and Koch, Friedrich, 4,303,816, Cl. 219-10.49R.

Koch, Robert L., II, to George Koch Sons, Inc. Spray booth with reconditioning filter system. 4,303,417, Cl. 55-96.000.

Kocourek, Franz: *See*—
Hehn, Wilfried; Kurths, Siegfried; Sieber, Werner; and Kocourek, Franz, 4,303,330, Cl. 354-319.000.

Kodet, Reuben P.; Kohlmeier, Wayne E.; and Schuster, Willard A., to American Hospital Supply Corporation. Bassinet. 4,302,857, Cl. 5-2.00R.

Koehler, Gerard: *See*—
Arnoux, Daniel; Koehler, Gerard; Leconte, Andre; Genter, Claude; and Michel, Bernard, 4,303,843, Cl. 310-67.00R.

Koehler Manufacturing Company: *See*—
Gulliksen, John E., 4,303,746, Cl. 429-140.000.

Koei Chemical Co., Ltd.: *See*—
Kawabata, Nariyoshi; and Yasuda, Sinichi, 4,303,531, Cl. 210-663.000.

Koga, Masao: *See*—
Takahashi, Kohki; Kondoh, Takeo; Koga, Masao; and Nishiwaki, Kenichiro, 4,303,560, Cl. 260-4.00R.

Kohlmeier, Wayne E.: *See*—
Kodet, Reuben P.; Kohlmeier, Wayne E.; and Schuster, Willard A., 4,302,857, Cl. 5-2.00R.

Kojima, Masaru: *See*—
Ishihara, Takeshi; and Kojima, Masaru, 4,303,799, Cl. 174-176.000.
Kojima, Shigeru: *See*—
Ueda, Akiyoshi; Kojima, Shigeru; Yasuda, Yasushi; Nishikawa, Hiroaki; and Nakada, Akira, 4,303,667, Cl. 424-274.000.
Kokarev, Vladimir I.: *See*—
Maslakov, Petr A.; Klushin, Nikolai A.; Juriev, Leonid A.; Kokarev, Vladimir I.; Kilin, Viktor E.; Galimov, Anas G.; Sutyagin, Oleg Y.; and Yankovsky, Oleg A., 4,303,002, Cl. 91-225.000.
Kokubo, Toshimitsu: *See*—
Moro, Tadao; Sakamoto, Hiroshi; Yamamoto, Mitsuru; Kokubo, Toshimitsu; and Masuda, Kaoru, 4,303,526, Cl. 210-512.300.
Kokusai Denshin Denwa Co., Ltd.: *See*—
Yatsuzuka, Yohtaro, 4,303,803, Cl. 177-15.55R.
Kolacz, Ferdynand, to Allis-Chalmers Corporation. Positive locking shift coupler. 4,303,151, Cl. 192-114.00R.
Kolehmainen, Seppo E.; and Tarkkanen, Veikko. Selective determination of nucleotides in viable somatic and microbial cells. 4,303,752, Cl. 435-8.000.
Kollmorgen Technologies Corporation: *See*—
Paunovic, Milan, 4,303,798, Cl. 174-68.500.
Komatsu, Kazumiya: *See*—
Katoh, Noboru; Komatsu, Kazumiya; and Nozaki, Hisashi, 4,303,685, Cl. 426-332.000.
Kondelikova, Jaroslava: *See*—
Kralicek, Jaroslav; Kubanek, Vladimir; Marik, Jiri; Kondelikova, Jaroslava; Machacek, Jiri; and Casensky, Bohuslav, 4,303,778, Cl. 528-312.000.
Kondo, Takashi; and Hashimoto, Nobuo, to Minolta Camera Kabushiki Kaisha. Distance measuring arrangement. 4,303,981, Cl. 364-525.000.
Kondoh, Takeo: *See*—
Takahashi, Kohki; Kondoh, Takeo; Koga, Masao; and Nishiwaki, Kenichiro, 4,303,560, Cl. 260-4.00R.
Konishiroku Photo Industry Co., Ltd.: *See*—
Sakai, Yuki, 4,303,332, Cl. 355-14.00R.
Konno, Kazutoshi: *See*—
Fujita, Masahiko; Hayashi, Kenji; and Konno, Kazutoshi, 4,303,210, Cl. 242-200.000.
Kopf, David A.: *See*—
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Korlatzki, Rudi: *See*—
Erk, Gayyur; and Korlatzki, Rudi, 4,303,711, Cl. 428-36.000.
Kosoczky, Ibolya: *See*—
Berenyi nee Poldermann, Edit; Szirt nee Kiszelly, Eniko; Gorog, Peter; Petocz, Lujza; Kosoczky, Ibolya; Kovacs nee Palotai, Agnes; and Urmos nee Lassu, Gabriella, 4,303,660, Cl. 424-251.000.
Kosswig, Kurt; and Wienhoefer, Ekkehard, to Chemische Werke Huels, A.G. Adducts of alcohols and olefin oxides as biodegradable and low-foaming tensides useful in detergents. 4,303,544, Cl. 252-174.210.
Kotani, Yasuo: *See*—
Hasegawa, Masayasu; Nishikawa, Hideo; and Kotani, Yasuo, 4,303,668, Cl. 424-279.000.
Kottmann, Helmut, to Mahle GmbH. Aluminium 2-stroke engine cylinder and crank case. 4,303,044, Cl. 123-65.00R.
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Kozminski, Andre A. Surfboard and method of constructing same. 4,302,859, Cl. 9-310.00E.
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Bard, Allen J.; and Kraeutler, Bernhard, 4,303,486, Cl. 204-162.00R.
Kraftwerk Union Aktiengesellschaft: *See*—
Behrmann, Alfred; Gottschlich, Herbert; Koch, Christian; and Abel, Otto, 4,303,495, Cl. 208-8.0LE.
Schieder, Erwin; and Stoiber, Rupert, 4,303,511, Cl. 210-724.000.
Kralicek, Jaroslav; Kubanek, Vladimir; Marik, Jiri; Kondelikova, Jaroslava; Machacek, Jiri; and Casensky, Bohuslav, to Vysoka skola chemicko-technologicka. Method of anionic polymerization of ω-aminoacid lactams with alkali metal-Al,B-alkoxy lactamate initiator. 4,303,778, Cl. 528-312.000.
Kramer, Joel; and Cohen, William D., to North Atlantic Industries, Inc. Apparatus for securing and releasing tape cartridges from tape decks. 4,303,955, Cl. 360-93.000.
Kramer, Ulrich: *See*—
Geistert, Walter; Kramer, Ulrich; and Klippel, Gottfried, 4,303,499, Cl. 208-33.000.
Kramp, Walter; and Philipp, Clemens, to Fried, Krupp Gesellschaft mit beschrankter Haftung. Method of and apparatus for removing front and rear segments of rolled wire. 4,302,994, Cl. 83-23.000.
Krass, James E., Jr.: *See*—
Juhasz, John E.; and Krass, James E., Jr., 4,303,850, Cl. 235-92.0FP.
Kreitzer, Melvyn H., to Vivitar Corporation. Compact wide angle lens. 4,303,315, Cl. 350-461.000.
Kresge, Edward N.: *See*—
O'Farrell, Charles P.; and Kresge, Edward N., 4,303,766, Cl. 525-353.000.
Krieger, Heinrich. Cascade multicomponent cooling method for liquefying natural gas. 4,303,427, Cl. 62-9.000.
Kruger, Bernard M., to Richter, Norbert, a part interest. Dental articulator. 4,303,390, Cl. 433-59.000.
Kubanek, Vladimir: *See*—
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Kubota Ltd.: *See*—
Hino, Masamichi; and Nishikawa, Hiroshi, 4,303,139, Cl. 177-210.0FP.
Kuboyama, Morio: *See*—
Ogasa, Katsuhiro; Kuboyama, Morio; Kuwahara, Kunisuke; Kato, Ryo; and Shimada, Hiroshi, 4,303,678, Cl. 426-46.000.
Kuhne, Gerhard, to Hoechst Aktiengesellschaft. Process for the dimerization of hexafluoropropene oxide. 4,303,593, Cl. 260-544.00F.
Kumiai Chemical Industry Co., Ltd.: *See*—
Chiyomaru, Isao; Sugiyama, Hidetoshi; Niita, Koyata; Fujimori, Kunihiko; Hirano, Tadayoshi; and Tada, Osamu, 4,303,653, Cl. 424-203.000.
Kuno, Akira: *See*—
Yoshino, Yasuhisa; Kuno, Akira; and Shinoda, Yoshio, 4,302,973, Cl. 73-384.000.
Kuraray Co., Ltd.: *See*—
Okabe, Susumu; Omura, Yoshiaki; Ninagawa, Yoichi; and Fujita, Yoshiji, 4,303,588, Cl. 260-404.500.
Kurita, Atsushi: *See*—
Hatanaka, Masayuki; and Kurita, Atsushi, 4,303,572, Cl. 260-37.0SB.
Kuroshima, Nobuaki; and Mashiki, Koichi, to Asahi-Dow Limited. Process for stabilizing vinylidene chloride resins. 4,303,564, Cl. 260-23.0XA.
Kurotaki, Yoshimi: *See*—
Nakamura, Kiyoshi; Isaka, Masayoshi; Kurotaki, Yoshimi; and Suzuki, Yutaka, 4,303,870, Cl. 318-135.000.
Kurths, Siegfried: *See*—
Hehn, Wilfried; Kurths, Siegfried; Sieber, Werner; and Kocourek, Franz, 4,303,330, Cl. 354-319.000.
Kurtz, Arthur P., Jr.: *See*—
Durden, John A., Jr.; and Kurtz, Arthur P., Jr., 4,303,788, Cl. 544-164.000.
Kurzhals, Gerd: *See*—
Riegel, Hans; and Kurzhals, Gerd, 4,303,007, Cl. 98-40.00D.
Kusan, Inc.: *See*—
Pun, Kwok-Wah, 4,302,903, Cl. 46-150.000.
Kuwabara, Takao; Uchiyama, Hisaya; and Okumura, Hiroshi, to Hitachi, Ltd. Control apparatus and method of operating the same. 4,303,370, Cl. 415-17.000.
Kuwahara, Kunisuke: *See*—
Ogasa, Katsuhiro; Kuboyama, Morio; Kuwahara, Kunisuke; Kato, Ryo; and Shimada, Hiroshi, 4,303,678, Cl. 426-46.000.
Kuznetsov, Andrei L.; Sudarev, Anatoly V.; Ivakhnenko, Viktor V.; Lamm, Jury A.; Maev, Vladimir A.; and Zakharov, Jury I. Annular combustor of gas turbine engine. 4,302,932, Cl. 60-39.320.
Kwik-Way Manufacturing Company: *See*—
Bradley, Robert W.; and Anderson, Vyron E., 4,302,882, Cl. 33-180.00B.
Kyles, Bruce W., to General Electric Company. Heating appliance and thermostat mount. 4,303,827, Cl. 219-512.000.
L.B. (Plastics) Limited: *See*—
Hardy, Terence, 4,303,289, Cl. 312-330.00R.
La Crosse Cooler Company: *See*—
Spring, Carl E., 4,303,179, Cl. 221-7.000.
LaBelle, Theodore J.; and Sorli, Duncan C., to Polaroid Corporation. Film cassette with pressure plate assembly latching system. 4,303,327, Cl. 354-276.000.
Lacher, Douglas M. Herb processing machine. 4,303,502, Cl. 209-3.000.
LaCourse, William C.; and Clark, Terence J., to Borg-Warner Corporation. Fiberizable glass. 4,303,446, Cl. 501-35.000.
Lada, Christopher O., to Sycor, Inc. Ink ribbon drive for data printers. 4,303,345, Cl. 400-229.000.
Laepple, Werner; and Wienert, Gisela, to Dow Corning GmbH. Water based lubricant. 4,303,537, Cl. 252-30.000.
Laguilharre, Pierre R.; and Ciboit, Jacques J., to Laguilharre S.A. Mechanical vapor recompression evaporators. 4,303,468, Cl. 159-47.00R.
Laguilharre S.A.: *See*—
Laguilharre, Pierre R.; and Ciboit, Jacques J., 4,303,468, Cl. 159-47.00R.
L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See*—
Vandenbussche, Gerard, 4,303,428, Cl. 62-13.000.
Lam, Charles T. W., to Miles Laboratories, Inc. Method and device for the semiquantitative determination of glucose in aqueous fluids. 4,303,753, Cl. 435-14.000.
Lam, Hsaio-Ling, to Stauffer Chemical Company. N-substituted haloacyloxyacetamides herbicidal antidotes. 4,303,792, Cl. 548-215.000.
Lam, Margaret M.: *See*—
Conley, Richard A.; Lam, Margaret M.; and High, Leroy B., 4,303,795, Cl. 560-43.000.
Lamarche, Paul E.: *See*—
Fall, Don R.; and Lamarche, Paul E., 4,302,951, Cl. 64-27.00C.
Lambert, Kenneth W., to Lucas Industries Limited. Master-slave flip-flop circuits. 4,303,838, Cl. 307-272.00A.
Lamers, Hendricus F., to Van Doorne's Transmissie B.V. Composite driving belt. 4,303,403, Cl. 474-201.000.
La Mers, Herbert, to Gar Doc, Incorporated. Labelling system. 4,303,461, Cl. 156-361.000.

Lamisse, Michel G., to Eastman Kodak Company. Metal recovery process. 4,303,441, Cl. 75-109.000.
Lamm, Jury A.: *See—*
Kuznetsov, Andrei L.; Sudarev, Anatoly V.; Ivakhnenko, Viktor V.; Lamm, Jury A.; Maev, Vladimir A.; and Zakharov, Jury I., 4,302,932, Cl. 60-39.320.
La Monica, Gaspare, to Samifi Babcock, S.p.A. Apparatus capable of operating both as nitrogen generator and carbon dioxide absorber, particularly for the preservation under controlled atmosphere of products, such as fruit and vegetable products. 4,303,009, Cl. 99-474.000.
Lancaster, Patrick R.; and Lancaster, William G., to Lantech Inc. Film web drive stretch wrapping apparatus and process. 4,302,920, Cl. 53-399.000.
Lancaster, William G.: *See—*
Lancaster, Patrick R.; and Lancaster, William G., 4,302,920, Cl. 53-399.000.
Langanke, Rolf: *See—*
Reuschenbach, Hermann; Wirges, Winfried; and Langanke, Rolf, 4,303,231, Cl. 267-64.150.
Langer, Alois A.: *See—*
Heilman, Marlin S.; and Langer, Alois A., 4,303,075, Cl. 128-419.0PG.
Lanier Business Products, Inc.: *See—*
Plunkett, Luther C., Jr., 4,303,998, Cl. 369-29.000.
Lans, Hakan. Data processing system and apparatus for color graphics display. 4,303,986, Cl. 364-900.000.
Lantech Inc.: *See—*
Lancaster, Patrick R.; and Lancaster, William G., 4,302,920, Cl. 53-399.000.
Larson, Theodore L.: *See—*
Gini, Donald; Larson, Theodore L.; Merten, Ronald A.; and Simonetti, Alex, 4,303,738, Cl. 428-423.100.
LaRue, Earl P. Individual safety firing button for guns. 4,302,898, Cl. 42-1.0LP.
Latham, Allen, Jr., to Haemonetics Corporation. Apparatus for separating blood into components thereof. 4,303,193, Cl. 233-23.00A.
Laugerud, Sverre: *See—*
Etnestad, Hermann; and Laugerud, Sverre, 4,303,022, Cl. 110-245.000.
Laura, Richard; and Bing, David H., to Center for Blood Research, Inc. Amidinophenylmethylsulfonylfluoride. 4,303,592, Cl. 260-543.00F.
Laursen, Bente L., to Berol Kemi AB. Method of producing fluffed pulp. 4,303,471, Cl. 162-158.000.
Law, William J. H., to AAL Enterprises, Inc. Military vehicle. 4,303,271, Cl. 296-10.000.
Lebet, Jean-Pierre: *See—*
Boegli, Serge; and Lebet, Jean-Pierre, 4,303,080, Cl. 131-202.000.
Lech, Thaddeus, Jr., to Borg-Warner Corporation. Clutch driven plate with spline locking hub. 4,303,149, Cl. 192-70.190.
Leclerc, Jean-Francois; Paret, Jacques; and Waegaert, Pierre, to Service d'Exploitation Industrielle des Tabacs et des Allumettes. Process for laying out a maximum number of wrappers for cigars in a leaf or half-leaf of tobacco. 4,303,081, Cl. 131-282.000.
Leclercq, Joseph, to Societe Franco-Americaine de Construction Atomiques-Framtome. Dismountable fuel assembly for nuclear reactor. 4,303,476, Cl. 376-446.000.
Leconte, Andre: *See—*
Arnoux, Daniel; Koehler, Gerard; Leconte, Andre; Genter, Claude; and Michel, Bernard, 4,303,843, Cl. 310-67.00R.
Lee, Len F.: *See—*
Howe, Robert K.; and Lee, Len F., 4,303,439, Cl. 71-88.000.
Legris, Andre, to Societe Legris France S.A. Instant fitting for reinforced multilayer flexible tubings for fluids. 4,303,263, Cl. 285-249.000.
Lehmann, Edmund J. Convertible table. 4,303,018, Cl. 108-12.000.
Lehmann, Hans-Dieter, to Gambro Dialysatoren GmbH & Co KG. Column for the treatment of a liquid by means of a particulate material. 4,303,521, Cl. 210-282.000.
Leigh, George C.: *See—*
Hinchcliffe, Dennis; and Leigh, George C., 4,303,366, Cl. 414-419.000.
Leiker, Dale H., to Gould Inc. Portable hose fitting crimping device. 4,302,960, Cl. 72-402.000.
Leinhaas, Werner. Press or similar machine tool. 4,302,961, Cl. 72-451.000.
Leistner, Guter, to August Ruggelberg, Firma. Rotary flap wheel type grinding tool with outwardly flaring flaps. 4,302,911, Cl. 51-334.000.
Leith, Mitsuko: *See—*
Taniguchi, Yoshifumi, 4,303,143, Cl. 181-263.000.
Leon L. Berkowitz Co.: *See—*
Henry, Jack C., 4,303,163, Cl. 211-133.000.
Lerner, George: *See—*
Ellman, Steven; Ellman, Fredric; Lerner, George; and Ellman, Julius, 4,303,240, Cl. 273-1.0GF.
Lesster, Laban E.; and Opdahl, Everett W., to Westinghouse Electric Corp. Inductive coupler. 4,303,902, Cl. 336-83.000.
Letsche, David M., to Letsche, David M. Welding light. 4,303,967, Cl. 362-119.000.
Levens, Dennis L., to Minnesota Mining and Manufacturing Company. Ultraviolet polymerization of acrylate monomers using oxidizable tin compounds. 4,303,485, Cl. 204-159.240.
Levine, Morris; Yurcheshen, Michael; and Hight, Roland W., to PPG Industries, Inc. Water dispersed primer-surfacer composition. 4,303,581, Cl. 260-18.0PF.
Levine, Seymour; and Wing, Willis G., to Sperry Corporation. North finder with optical transfer provision. 4,302,885, Cl. 33-228.000.
Levy, Edward D.: *See—*
Chrichton, John P.; Trebel, John M.; Cuff, George W.; Goodwin, David H.; and Levy, Edward D., 4,302,990, Cl. 81-60.000.
Lewin, Arthur; and Nickel, Bernd, to Siemens Aktiengesellschaft. Device for the measurement of the location, the position and/or the change of location or of position of a rigid body in space. 4,303,077, Cl. 128-777.000.
Lewis, Irwin C.: *See—*
Lewis, Richard T.; and Lewis, Irwin C., 4,303,631, Cl. 423-447.100.
Lewis, Jay L., to Robertshaw Controls Company. Intermittent patient suction system and control means therefor. 4,303,072, Cl. 128-276.000.
Lewis, Richard T.; and Lewis, Irwin C., to Union Carbide Corporation. Process for producing carbon fibers. 4,303,631, Cl. 423-447.100.
Lewis, William R.; Smith, Dennis M.; and Jenness, Wendell G., to Hunter Engineering Company. Continuous caster feed tip. 4,303,181, Cl. 222-591.000.
Li, Yao T. Nitinol engine for low grade heat. 4,302,938, Cl. 60-527.000.
Li, Yao T., to Massachusetts Institute of Technology. Cable wind mill. 4,303,834, Cl. 290-55.000.
Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
Scheibe, Klaus, 4,303,814, Cl. 200-147.00R.
Thiele, Karl-Heinz, 4,303,806, Cl. 179-115.5VC.
Lichfield, William H. Production of layered toothpicks. 4,303,605, Cl. 264-158.000.
Lichter, Seymour; and Nold, Frank P. Process for the production of composite foamed material. 4,303,602, Cl. 264-45.400.
Liedtke, Kurt: *See—*
Focke, Heinz; and Liedtke, Kurt, 4,303,155, Cl. 206-264.000.
Life Savers, Inc.: *See—*
Witzel, Frank; Di Nolfo, Mario A.; Rodney, Burton; and Mackay, Donald A. M., 4,303,648, Cl. 424-158.000.
Lilie, Kenneth R. Separating apparatus. 4,303,509, Cl. 209-403.000.
Lincoln Manufacturing Co.: *See—*
Frankforter, Norris K., 4,303,380, Cl. 425-27.000.
Lindahl, Ulf P. F.; Backstrom, Gudrun E.; Thunberg, John Y. L.; Fransson, Lars-Ake; Andersson, Lars-Olov; Holmer, Erik Y.; Sandberg, Inga H.; and Soderstrom, Ewa G., to Kabi AB. Heparin fragments having selective anticoagulation activity. 4,303,651, Cl. 424-183.000.
Lindbergh, Charles. Vertically collapsing closure system. 4,303,117, Cl. 160-189.000.
Linde Aktiengesellschaft: *See—*
Reimann, Hans; and Wildmoser, Alfred, 4,303,527, Cl. 210-614.000.
Linden-Alimak AB: *See—*
Andersson, Rickard; and Danerlov, Ove, 4,303,164, Cl. 212-146.000.
Lindquist, Robert M.: *See—*
Cutler, Robert S.; and Lindquist, Robert M., 4,303,545, Cl. 252-174.210.
Lindstrom, Alf I., to Sunds Defibrator Aktiebolag. Screening apparatus. 4,303,207, Cl. 241-261.200.
Linthorst, Johanna M.: *See—*
Stolz, Robert P.; Ouellette, Norman P.; Linthorst, Johanna M.; and Herlihy, Thomas V., 4,303,686, Cl. 426-386.000.
Lion Corporation: *See—*
Tanaka, Yoshiro; Okabe, Akio; and Ando, Susumu, 4,303,590, Cl. 260-410.90R.
Litchfield, William B.; Gent, John T.; and Graham, James A. S., to Rolls-Royce Limited. Coating material. 4,303,737, Cl. 428-406.000.
Litton Industrial Products, Inc.: *See—*
Chrichton, John P.; Trebel, John M.; Cuff, George W.; Goodwin, David H.; and Levy, Edward D., 4,302,990, Cl. 81-60.000.
Litton Systems, Inc.: *See—*
Schaffer, Max A., 4,303,985, Cl. 364-701.000.
Llendado, Ramon A., to Procter & Gamble Company, The. Spray-dried detergent compositions. 4,303,556, Cl. 252-527.000.
Lockhart, David A., to Caterpillar Tractor Co. Coil wound spacer. 4,303,362, Cl. 411-153.000.
Lockheed Corporation: *See—*
Wirt, Leslie S., 4,303,144, Cl. 181-288.000.
Wirt, Leslie S., 4,303,520, Cl. 210-242.100.
Logan, John K. Siphonic irrigation apparatus. 4,303,092, Cl. 137-142.000.
Login, Robert B.: *See—*
Newkirk, David D.; Login, Robert B.; and Thir, Basil, 4,303,767, Cl. 525-444.000.
Logioco, John W.: *See—*
Kapadia, Uday S.; and Logioco, John W., 4,303,812, Cl. 200-6.00R.
Lohr, Delmar F.: *See—*
Kay, Edward L.; and Lohr, Delmar F., 4,303,597, Cl. 260-933.000.
Lopre Products, Inc.: *See—*
Lore, Nicola, 4,303,054, Cl. 125-11.00R.
Lore, Nicola, to Lopre Products, Inc. Detachable magnetic base for machine tool table. 4,303,054, Cl. 125-11.00R.
Loubier, Roger C.: *See—*
Petterson, Robert C.; and Loubier, Roger C., 4,303,454, Cl. 134-11.000.
Love, Leonard S.; and Crathern, Roger N., to Sydlo Inc. Liquid treatment apparatus. 4,303,517, Cl. 210-208.000.
Lubille Energy Development Co., Ltd.: *See—*
Summers, William A., 4,303,415, Cl. 48-202.000.
Lucas Industries, Ltd.: *See—*
Joby, Michael J., 4,303,976, Cl. 364-431.000.

Jones, Kenneth J., 4,303,305, Cl. 350-103.000.
Lambert, Kenneth W., 4,303,838, Cl. 307-272.00A.
Skinner, Robert T. J., 4,303,096, Cl. 137-512.000.

Lucian, Anton; Zwiener, Rudolf; and Roehrich, Siegfried, to Adolph Saurer Limited. Switching on device on an apparatus for intermittently taking off weft yarn. 4,303,107, Cl. 139-450.000.

Lucitron, Inc.: *See*—
Glaser, David, 4,303,847, Cl. 313-217.000.

Ludlow Corporation: *See*—
Clough, Philip J., 4,303,720, Cl. 428-211.000.

Lugovoi, Elektron P.: *See*—
Yakovlev, Vladimir K.; Lugovoi, Elektron P.; and Ivankov, Vasily A., 4,302,959, Cl. 72-138.000.

Luh, Yuhshi: *See*—
Chen, Catherine S. H.; Luh, Yuhshi; and Schmitt, Kirk D., 4,303,411, Cl. 23-230.0EP.

Luk, Catherine M., to Carice International Products, Ltd. Liquid crystal temperature indicator for measuring human body temperature. 4,302,971, Cl. 73-356.000.

Lukas, Michael P.: *See*—
Kaya, Azmi; Keyes, Marion A., IV; and Lukas, Michael P., 4,303,982, Cl. 364-550.000.

Luke, Wayne D.: *See*—
Chou, Ta-sen; Heath, Perry C.; and Luke, Wayne D., 4,303,591, Cl. 260-429.700.

Lund, Anders E.: *See*—
Haataja, Bruce A.; and Lund, Anders E., 4,303,019, Cl. 108-51.100.

Lundquist, Roger J., to General Motors Corporation. Dual pick-up fuel strainer assembly. 4,303,513, Cl. 210-132.000.

Lussling, Theodor; Muller, Klaus-Peter; Schreyer, Gerd; and Theissen, Ferdinand, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the recovery of methionine and potassium bicarbonate. 4,303,621, Cl. 423-189.000.

Lux, William J., to Philmac Corporation. Overcap assembly for valved containers. 4,303,175, Cl. 220-288.000.

Lyman, Daniel. Audio silencer for radio and T-V sets. 4,303,836, Cl. 307-114.000.

Lynch, Richard W.: *See*—
Dotson, Ronald L.; and Lynch, Richard W., 4,303,624, Cl. 423-184.000.

M&T Chemicals Inc.: *See*—
Warnez, Michel Y., 4,303,444, Cl. 106-16.000.

Macdonald, Ian. Method for obtaining 7$\beta$ hydroxy steroids. 4,303,754, Cl. 435-52.000.

MacGregor, Paul E., to Exacto-Mac Limited Partnership. Vehicle frame, body and wheel alignment gauge. 4,302,883, Cl. 33-180.0AT.

Machacek, Jiri: *See*—
Kralicek, Jaroslav; Kubanek, Vladimir; Marik, Jiri; Kondelikova, Jaroslava; Machacek, Jiri; and Casensky, Bohuslav, 4,303,778, Cl. 528-312.000.

Machacek, Robert W.; Nichols, Charles E.; and Howard, John R., to Drackett Company, The. Snow removal tool. 4,302,862, Cl. 15-117.000.

Mack, William M., Jr.: *See*—
Dixon, Guy E.; and Mack, William M., Jr., 4,302,865, Cl. 16-97.000.

Mackay, Donald A. M.: *See*—
Witzel, Frank; Di Nolfo, Mario A.; Rodney, Burton; and Mackay, Donald A. M., 4,303,648, Cl. 424-158.000.

Maeda, Chiaki: *See*—
Hisamoto, Iwao; Maeda, Chiaki; Esaka, Takasige; and Nishiwaki, Mitsuhiro, 4,303,534, Cl. 252-3.000.

Maeda, Yoshinari: *See*—
Takahashi, Yuzo; Maeda, Yoshinari; Tanaka, Yasuyuki; Nagai, Kastumi; and Oyama, Shiro, 4,303,032, Cl. 113-116.0QA.

Maehara, Fumio: *See*—
Tsuboka, Eiichi; Maehara, Fumio; Fujita, Hiroshi; Izura, Yoshiteru, deceased; and Izura, Keiko, heir, 4,303,988, Cl. 364-900.000.

Maeshima, Seiichi, to Descente Ltd. Vest with sleeves. 4,302,850, Cl. 2-102.000.

Maev, Vladimir A.: *See*—
Kuznetsov, Andrei L.; Sudarev, Anatoly V.; Ivakhnenko, Viktor V.; Lamm, Jury A.; Maev, Vladimir A.; and Zakharov, Jury I., 4,302,932, Cl. 60-39.320.

Magnavox Government & Industrial Electronics: *See*—
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Magyar Tudomanyos Akademia: *See*—
Petro, Jozsef; Pungor, Erno; Toth, Klara; and Rakias, Ferenc, 4,303,740, Cl. 428-548.000.

Maher, William M., to General Electric Company. Food processor and bearing. 4,303,282, Cl. 308-36.000.

Mahle GmbH: *See*—
Kottmann, Helmut, 4,303,044, Cl. 123-65.00R.

Maier, Peter: *See*—
Stensel, H. David; Maier, Peter; Biesinger, Mark G.; Refling, David R.; Klepper, Ronald P.; and Maxham, John V., 4,303,516, Cl. 210-195.400.

Maire, Alaine. Device for controlling the stopping of a train. 4,303,215, Cl. 246-182.00B.

Maixner, Vaclav; Miklas, Zdenek; Velinsky, Frantisek; Rypka, Cestmir; Vorisek, Premysl; Rohlena, Vaclav; and Divis, Vaclav, to Vyzkumny ustav bavlnarsky. Multi-component yarn and method of apparatus for its manufacture. 4,302,926, Cl. 57-58.950.

Makabe, Hachiro: *See*—
Takenoya, Hideaki; and Makabe, Hachiro, 4,303,028, Cl. 112-158.00E.

Makar, William. Quick-change hole saw mandrel. 4,303,357, Cl. 408-204.000.

Makuuchi, Teruji: *See*—
Shimizu, Kenichi; Kamiya, Akihiro; Yamazaki, Shu; Akiyama, Riozo; Makuuchi, Teruji; and Yoshizaki, Shiichiro, 4,303,848, Cl. 313-346.00R.

Malard, Marcel: *See*—
Pressiat, Robert; de Corlieu, Guy; Malard, Marcel; and d'Auria, Luigi, 4,303,300, Cl. 350-96.200.

Malick, Franklin S., to Westinghouse Electric Corp. Inflatable eddy current inspection probe for inspection of tubular means. 4,303,884, Cl. 324-220.000.

Mallory, William R.: *See*—
Morrison, Robert W., Jr.; Mallory, William R.; and Styles, Virgil L., 4,303,789, Cl. 544-323.000.
Morrison, Robert W., Jr.; Mallory, William R.; and Styles, Virgil L., 4,303,790, Cl. 544-323.000.

Manchem Limited: *See*—
Turner, John H. W., 4,303,726, Cl. 427-297.000.

Manfredo, Joseph N.; and Hirsch, Selwyn R., to Garrett Corporation, The. Charge air cooler mounting arrangement. 4,303,052, Cl. 123-563.000.

Mann, Fred W. Protected feeder for livestock. 4,303,040, Cl. 119-62.000.

Mannesmann DeMag AG: *See*—
Franke, Rudiger; Fauerbach, Rudolf; Wenzel, Michael; and Weiss, Aby, 4,303,140, Cl. 180-6.200.

Mansy, Samir A., to Procter & Gamble Company, The. Method for cleansing and conditioning the skin. 4,303,543, Cl. 252-117.000.

Manu-Tronics, Inc.: *See*—
Synek, Jan; and Tentler, Michael, 4,303,805, Cl. 179-81.00R.

Manufacture Metallurgique de Tournus: *See*—
Klein, Dominique, 4,303,741, Cl. 428-611.000.

Marangelli, Ugo; Ciocci, Giancarlo; and Papa, Sisto S., to Aziende Colori Nazionali Affini ACNA S.p.A. Concentrated coloring solutions of a blue tinge based on mixture of 1.4-dialkyl-anthraquinones for the coloring of petroliferous products. 4,303,407, Cl. 8-643.000.

Marchetti, Stephen: *See*—
Enemark, Robert B.; Galvin, Aaron A.; and Marchetti, Stephen, 4,303,908, Cl. 340-384.00E.

Marconi Company Limited, The: *See*—
Dooley, Graham C.; and Dunlop, Alistair J., 4,303,211, Cl. 244-3.190.

Marcus, Michael A., to Eastman Kodak Company. Annular piezoelectric plastic bender lens motor. 4,303,324, Cl. 354-195.000.

Margetson, Desmond W. Arm support device. 4,302,849, Cl. 2-115.000.

Marik, Jiri: *See*—
Kralicek, Jaroslav; Kubanek, Vladimir; Marik, Jiri; Kondelikova, Jaroslava; Machacek, Jiri; and Casensky, Bohuslav, 4,303,778, Cl. 528-312.000.

Marincic, Nikola; and McDonald, Robert C., to GTE Products Corporation. Method for reducing gas pressure in an electrochemical cell. 4,303,744, Cl. 429-52.000.

Marion, Frank A., to Synergy Corporation. Oxygen gas generator and method of manufacturing the gas generator. 4,303,413, Cl. 44-10.00A.

Marion, Henri A., to Compagnie Generale pour les Developpements Operationnels des Richesses Sous-Marines. Method for the building and putting in place of a sea platform with a gravity resting base, and means for implementing such a method. 4,303,352, Cl. 405-206.000.

Marks, Helmuth; and Fischer, Wilhelm. Internal sleeve seal and method of use. 4,303,103, Cl. 138-97.000.

Maron, Donald E., to Armstrong World Industries. Method of making an improved natural-textured ceiling tile. 4,303,703, Cl. 427-272.000.

Marple, Elwood: *See*—
Crandon, Reba L.; and Marple, Elwood, 4,303,057, Cl. 126-415.000.

Marr, Andrew W., Jr. Injection well with high-pressure, high-temperature in situ down-hole steam formation. 4,303,128, Cl. 166-302.000.

Mars Incorporated: *See*—
Guitteny, Jean L.; Plaze, Jean P.; Roux, Michel; and Warren, Gregory N., 4,303,682, Cl. 426-250.000.

Mart, Kenneth D., to Walker & Mart Solar Laboratories, Inc. Collector panel for solar heating system. 4,303,060, Cl. 126-445.000.

Martel, Jacques; Tessier, Jean; Teche, Andre; and Demoute, Jean-Pierre, to Roussel Uclaf. 3-Oxa-bicyclo (3,1,0)-hexan-2-one intermediates. 4,303,585, Cl. 260-343.30R.

Martens, Uwe: *See*—
Kneifel, Klemens; Hilgendorff, Walther; and Martens, Uwe, 4,303,493, Cl. 204-301.000.

Marti, Bernard; Poignet, Alain; Fournier, Claude; and Roche, Christian, to Establissement Public de Diffusion dit "Telediffusion de France"; Fournier, Claude; and Roche, Christian. Videotex system. 4,303,941, Cl. 358-147.000.

Martin, Franklin J., to Martin, James A., a part interest. Electronically alarmed lock. 4,303,909, Cl. 340-543.000.

Martin, James A.: *See*—
Martin, Franklin J., 4,303,909, Cl. 340-543.000.

Martinez, Francisco P. Tearable bottle caps. 4,303,167, Cl. 215-256.000.

Maschinenfabrik Andritz Aktiengesellschaft: *See*—
Syrowatka, Rupert, 4,302,871, Cl. 29-110.000.

Mashiki, Koichi: *See*—
Kuroshima, Nobuaki; and Mashiki, Koichi, 4,303,564, Cl. 260-23.0XA.

Maskinfabriken Waco AB: *See*—
Andersson, Bengt A., 4,303,113, Cl. 144-230.000.

Maslakov, Petr A.; Klushin, Nikolai A.; Juriev, Leonid A.; Kokarev, Vladimir I.; Kilin, Viktor E.; Galimov, Anas G.; Sutyagin, Oleg Y.;

and Yankovsky, Oleg A. Hand-operated pneumatic impact machine. 4,303,002, Cl. 91-225.000.

Massachusetts Institute of Technology: *See*—
Li, Yao T., 4,303,834, Cl. 290-55.000.

Mastalka, Frank T.: *See*—
Clemensen, Carl L.; and Mastalka, Frank T., 4,303,713, Cl. 428-121.000.

Masuda, Kaoru: *See*—
Moro, Tadao; Sakamoto, Hiroshi; Yamamoto, Mitsuru; Kokubo, Toshimitsu; and Masuda, Kaoru, 4,303,526, Cl. 210-512.300.

Masutani, Takayoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Device for indicating the rate of charge in an AC generator. 4,303,878, Cl. 322-99.000.

Matsuba, Masaharu: *See*—
Sugiyama, Kiyoshi; Matsuba, Masaharu; Iwagami, Fusao; and Fukumoto, Khoki, 4,303,928, Cl. 346-75.000.

Matsuda, Motonobu; and Tanaka, Yoshihiro, to Minolta Camera Kabushiki Kaisha. Automatic distance measuring device. 4,303,335, Cl. 356-1.000.

Matsui, Sei, to Nippon Kogaku K.K. Compact telephoto lens. 4,303,314, Cl. 350-456.000.

Matsui, Takashi: *See*—
Oyamada, Kozo; Matsui, Takashi; Tobitsuka, Junzo; Yamazaki, Yoshio; and Ogawa, Masami, 4,303,440, Cl. 71-89.000.

Matsumoto, Kazuhisa: *See*—
Suzuki, Takashi; Akai, Shin-ichi; Mori, Hideki; Aoyagi, Katsunosuke; Shimoda, Takashi; Matsumoto, Kazuhisa; and Sasaki, Masami, 4,303,464, Cl. 156-605.000.

Matsuo, Akira: *See*—
Miyazawa, Osamu; Oka, Hitoshi; Tanaka, Isamu; Matsuo, Akira; Yokono, Hitoshi; Nakagawa, Nobuo; and Isogai, Tokio, 4,303,443, Cl. 106-1.230.

Matsuoka, Tomizo: *See*—
Tohda, Takao; Nitta, Tsuneharu; Fukuda, Yoji; Matsuoka, Tomizo; and Terada, Ziro, 4,303,913, Cl. 340-704.000.

Matsuoka, Yoshitaka; Shimazoe, Michitaka; Yamamoto, Yoshimi; Ai, Mitsuo; Miyauchi, Keiji; Nemoto, Hideyuki; Tsuchiya, Masatoshi; and Tanabe, Masanori, to Hitachi, Ltd. Pressure sensitive apparatus. 4,303,903, Cl. 338-4.000.

Matsushima, Masaru: *See*—
Nakayama, Masaharu; Matsushima, Masaru; Banno, Shigeki; and Kanazawa, Nobuo, 4,303,762, Cl. 525-299.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Fukuda, Shin; and Hirashima, Masayoshi, 4,303,942, Cl. 358-147.000.
Inoue, Isamu; Minamide, Seiko; and Okuda, Makoto, 4,303,857, Cl. 250-328.000.
Iwai, Ryuichiro, 4,303,874, Cl. 318-331.000.
Kawabe, Hidehiko; Yoshino, Yozo; and Jizodo, Yozo, 4,302,906, Cl. 47-62.000.
Kitamura, Tsutomu, 4,303,944, Cl. 358-191.100.
Sawada, Daisaku; Takahashi, Juhei; and Miura, Kenzo, 4,302,964, Cl. 73-35.000.
Taniguchi, Hiroshi; Yano, Osahiko; Yamamitsu, Chojuro; Kitamura, Sadafumi; and Ohtsu, Masamitsu, 4,303,950, Cl. 360-19.000.
Tohda, Takao; Nitta, Tsuneharu; Fukuda, Yoji; Matsuoka, Tomizo; and Terada, Ziro, 4,303,913, Cl. 340-704.000.

Matsushita Electric Industrial Co., Ltd: *See*—
Yamamitsu, Chojuro; Arimura, Ichiro; and Taniguchi, Hiroshi, 4,303,952, Cl. 360-65.000.

Matthews, Russell B.: *See*—
Rudich, George, Jr.; and Matthews, Russell B., 4,303,385, Cl. 431-70.000.

Mauldin, Charles H.: *See*—
Eberly, Paul E., Jr.; Mauldin, Charles H.; and Baird, William C., Jr., 4,303,500, Cl. 208-139.000.

Maurer, Roland: *See*—
Wolber, Robert; Maurer, Roland; and Jesse, Peter, 4,303,962, Cl. 361-399.000.

Maxham, John V.: *See*—
Stensel, H. David; Maier, Peter; Biesinger, Mark G.; Refling, David R.; Klepper, Ronald P.; and Maxham, John V., 4,303,516, Cl. 210-195.400.

May, Curtis L., to Magnavox Government & Industrial Electronics. Adaptive enhancement of signal-to-noise ratio in television imagery. 4,303,943, Cl. 358-167.000.

May, Denis R. W., to J. E. Hanger & Company Limited. Artificial limbs. 4,302,856, Cl. 3-30.000.

May, Roger C.; and Geiger, Gary E., to Betz Laboratories, Inc. Corrosion inhibition treatments and method. 4,303,568, Cl. 260-29.6MP.

Mayer, Donald K., to Thermo King Corp. Crankcase oil return valve. 4,303,090, Cl. 137-114.000.

Mayfield, Robert J.: *See*—
Jones, Francis W.; Mayfield, Robert J.; and O'Loughlin, Gary J., 4,303,652, Cl. 424-200.000.

Maytag Company, The: *See*—
Ross, Frank E., 4,303,406, Cl. 8-158.000.

McCann, Douglas W.: *See*—
Carlin, William W.; and McCann, Douglas W., 4,303,487, Cl. 204-180.00P.

McCann, John D., to Parmeko Limited. Detection system. 4,303,910, Cl. 340-572.000.

McCann, Thomas J.; and Regan, Ernest E., to Biscayne Decorative Products, Inc. Crinkle emboss and method. 4,303,695, Cl. 427-44.000.

McCarthy, John P.: *See*—
Kaufman, Harold B., Jr.; and McCarthy, John P., 4,303,819, Cl. 219-10.55R.

McCaully, Ronald J.: *See*—
Kim, Dong H.; and McCaully, Ronald J., 4,303,583, Cl. 260-239.30T.

McClellan, Ralph E., to Meilink Industries, Inc. Insulated filing cabinet. 4,303,286, Cl. 312-214.000.

McCue, John, to Coal Industry (Patents) Limited. Infra-red analysis apparatus and method. 4,303,859, Cl. 250-338.000.

McDonald, Robert C.: *See*—
Marincic, Nikola; and McDonald, Robert C., 4,303,744, Cl. 429-52.000.

McDowell, Guy, Jr., to Peabody Coal Company. Mine roof bolting. 4,303,354, Cl. 405-261.000.

McElveen, Robert H. Process for recording visual scenes for reproduction in stereopsis. 4,303,316, Cl. 352-57.000.

McGlennon, Gordon L. Load multiplying mechanisms. 4,303,012, Cl. 100-272.000.

McGregor, Douglas D.: *See*—
Carmichael, Leland E.; Appel, Max J. G.; and McGregor, Douglas D., 4,303,645, Cl. 424-89.000.

McHale, William D.; and Bendoraitis, Joseph G., to Mobil Oil Corporation. Polymerization of cyclic ethers. 4,303,782, Cl. 528-416.000.

McIntyre, Melville D.: *See*—
Shaw, Jack C.; Gilbert, John F.; Olbrechts, Guy R.; and McIntyre, Melville D., 4,303,978, Cl. 364-453.000.

McMorrow, John J.; Kaplan, Harold; and Sommerhalter, Frederick, Jr. Blood identification means. 4,302,956, Cl. 70-312.000.

McNeel, William O., to GEO Space Corporation. Multiple pin connector for multiple conductor cable. 4,303,292, Cl. 339-45.00M.

McNeil Corporation: *See*—
Rademacher, Thomas P., 4,303,515, Cl. 210-169.000.

Mead Corporation, The: *See*—
Suttles, James M., 4,303,162, Cl. 211-49.00D.
Young, Ainslie T., Jr., 4,303,924, Cl. 346-1.100.

Mead, Harold C., to Nixdorff Krein Industries, Inc. Agricultural applicator apparatus. 4,302,904, Cl. 47-1.500.

Mechnick, William R. Photographic printing device. 4,303,333, Cl. 355-27.000.

Medical Incorporated: *See*—
Shah, Suresh T.; Huffstutler, Miles C., Jr.; and Bentzen, Bruce D., 4,303,530, Cl. 210-651.000.

Medical Plastics, Inc.: *See*—
Archibald, G. Kent, 4,303,073, Cl. 128-303.130.

Meginnis, George B., to General Motors Corporation. Patterned porous laminated material. 4,302,940, Cl. 60-754.000.

Meilink Industries, Inc.: *See*—
McClellan, Ralph E., 4,303,286, Cl. 312-214.000.

Meiners, Hans J.: *See*—
Ganster, Otto; Meiners, Hans J.; Eifler, Willi; Meyborg, Holger; and Schwindt, Jurgen, 4,303,773, Cl. 528-64.000.

Meinhold, Henner, to Brown, Boveri & Cie Aktiengesellschaft. Circuit for protecting storage cells. 4,303,877, Cl. 320-6.000.

Membrino, Robert J.; and Gilbreath, George D., Jr., to Singer Company, The. Digital data sorter external to a computer. 4,303,989, Cl. 364-900.000.

Menardi-Southern Corp.: *See*—
Cox, Louis F., Jr., 4,303,425, Cl. 55-378.000.

Mercer, Frank B., to P.L.G. Research Limited. Plastics material mesh structure. 4,303,714, Cl. 428-135.000.

Meredith, Michael D.; Bentvelzen, Jozef M.; and Bepple, Henry, to Weyerhaeuser Company. Method and apparatus for mixing gases with a wood pulp slurry. 4,303,470, Cl. 162-57.000.

Merkenich, Karl: *See*—
Wasel-Nielen, Joachim; Merkenich, Karl; Gehrig, Oskar, deceased; and Sommer, Klaus, 4,303,541, Cl. 252-70.000.

Merrie, Kenneth: *See*—
Walker, Brian; and Merrie, Kenneth, 4,303,472, Cl. 162-221.000.

Merten, Josef: *See*—
Idel, Karsten; and Merten, Josef, 4,303,781, Cl. 528-388.000.

Merten, Ronald A.: *See*—
Gini, Donald; Larson, Theodore L.; Merten, Ronald A.; and Simonetti, Alex, 4,303,738, Cl. 428-423.100.

Mesek, Frederick K., to Johnson & Johnson Baby Products Company. Disposable undergarment. 4,302,853, Cl. 2-402.000.

Metallgesellschaft Aktiengesellschaft: *See*—
Thomsen, Adolf, 4,303,633, Cl. 423-574.00R.

Metallurgie Hoboken-Overpelt: *See*—
Dompas, John M. A., 4,303,227, Cl. 266-69.000.

Meyborg, Holger: *See*—
Ganster, Otto; Meiners, Hans J.; Eifler, Willi; Meyborg, Holger; and Schwindt, Jurgen, 4,303,773, Cl. 528-64.000.

Meyer, Allen E.: *See*—
Hill, Jeremy R.; and Meyer, Allen E., 4,303,887, Cl. 324-441.000.

Meyer, Gustave C., III. Holder for a wooden workpiece. 4,303,233, Cl. 269-54.500.

Micafil AG: *See*—
Rossi, Quido, 4,303,436, Cl. 65-67.000.

Michaelis, Klaus-Peter, to Ciba-Geigy Corporation. Organo-antimony compounds. 4,303,578, Cl. 260-45.75B.

Michel, Bernard: *See*—
Arnoux, Daniel; Koehler, Gerard; Leconte, Andre; Genter, Claude; and Michel, Bernard, 4,303,843, Cl. 310-67.00R.

Michigan Motor Corporation: *See*—
Weishaar, Rainer E., 4,303,051, Cl. 123-557.000.

Michigan Technological University, Board of Control of: *See—*
Haataja, Bruce A.; and Lund, Anders E., 4,303,019, Cl. 108-51.100.
Michlin, Norman, to Universal Developer Corporation. Diazo copy machine with ammonia vapor absorber. 4,303,329, Cl. 354-300.000.
Microlife Technics, Inc.: *See—*
Raccach, Moshe, 4,303,679, Cl. 426-59.000.
Mielnicki, Joseph: *See—*
Jones, Frank W.; and Mielnicki, Joseph, 4,302,997, Cl. 83-425.300.
Miklas, Zdenek: *See—*
Maixner, Vaclav; Miklas, Zdenek; Velinsky, Frantisek; Rypka, Cestmir; Vorisek, Premysl; Rohlena, Vaclav; and Divis, Vaclav, 4,302,926, Cl. 57-58.950.
Miles, Bertrand H. Body protective clothing. 4,302,847, Cl. 2-2.000.
Miles Laboratories, Inc.: *See—*
Lam, Charles T. W., 4,303,753, Cl. 435-14.000.
Milgram, Jerome H., to Offshore Devices, Inc. Oil spill barriers. 4,303,351, Cl. 405-66.000.
Miller, Arthur F.: *See—*
Callahan, James L.; Shaw, Wilfrid G.; and Miller, Arthur F., 4,303,550, Cl. 252-413.000.
Miller, Frank J.: *See—*
Schwartz, Robert B.; Miller, Frank J.; and Vij, Hem R., 4,302,913, Cl. 52-39.000.
Mills, Franky, to Hamby Company, The. Furrow damming implement. 4,303,129, Cl. 172-530.000.
Minamide, Seiko: *See—*
Inoue, Isamu; Minamide, Seiko; and Okuda, Makoto, 4,303,857, Cl. 250-328.000.
Minemura, Norihiro; and Kimura, Takeo, to Teijin Limited. Process for the preparation of suede-like raised fabric. 4,303,706, Cl. 427-381.000.
Ministry of International Trade and Industry: *See—*
Kobubu, Akio; and Tanaka, Toshio, 4,303,956, Cl. 360-123.000.
Minnesota Mining and Manufacturing Company: *See—*
Levens, Dennis L., 4,303,485, Cl. 204-159.240.
Minolta Camera Kabushiki Kaisha: *See—*
Kitaura, Mashio; and Yamamoto, Koji, 4,303,318, Cl. 354-24.000.
Kondo, Takashi; and Hashimoto, Nobuo, 4,303,981, Cl. 364-525.000.
Matsuda, Motonobu; and Tanaka, Yoshihiro, 4,303,335, Cl. 356-1.000.
Mirowski, Mieczyslaw: *See—*
Heilman, Marlin S.; and Langer, Alois A., 4,303,075, Cl. 128-419.0PG.
Mitchell, Thomas O.; Whitehurst, Darrell D.; and Farcasiu, Malvina, to Mobil Oil Corporation. Desulfurization, demetalation and denitrogenation of coal. 4,303,497, Cl. 208-10.000.
MITEC-Moderne Industrietechnik GmbH: *See—*
Chaborski, Hoiko, 4,303,983, Cl. 364-569.000.
Mitsubishi Gas Chemical Company, Inc.: *See—*
Sano, Kozo; Igarashi, Hideo; and Ikarashi, Takeo, 4,303,630, Cl. 423-415.00A.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
Takahashi, Hisayoshi; Oda, Shoichi; Satoh, Hiroshi; and Sakai, Itsuro, 4,302,988, Cl. 74-798.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Takahashi, Hisayoshi; Oda, Shoichi; Satoh, Hiroshi; and Sakai, Itsuro, 4,302,988, Cl. 74-798.000.
Mitsubishi Paper Mills, Ltd.: *See—*
Shimazaki, Tetsuro; and Kamei, Shun, 4,303,548, Cl. 252-316.000.
Miura, Kenzo: *See—*
Sawada, Daisaku; Takahashi, Juhei; and Miura, Kenzo, 4,302,964, Cl. 73-35.000.
Miyakoshi, Junichi: *See—*
Aoki, Susumu; Asaumi, Hirosi; Take, Shigeo; Miyakoshi, Junichi; Takemoto, Hiroshi; and Kabayama, Kenta, 4,303,553, Cl. 252-478.000.
Miyano, Reiko: *See—*
Ohira, Toshiaki; Miyano, Reiko; and Yoshida, Ryonosuke, 4,303,452, Cl. 127-32.000.
Miyauchi, Keiji: *See—*
Matsuoka, Yoshitaka; Shimazoe, Michitaka; Yamamoto, Yoshimi; Ai, Mitsuo; Miyauchi, Keiji; Nemoto, Hideyuki; Tsuchiya, Masatoshi; and Tanabe, Masanori, 4,303,903, Cl. 338-4.000.
Miyazawa, Osamu; Oka, Hitoshi; Tanaka, Isamu; Matsuo, Akira; Yokono, Hitoshi; Nakagawa, Nobuo; and Isogai, Tokio, to Hitachi, Ltd. Electroless copper plating solution. 4,303,443, Cl. 106-1.230.
Mobay Chemical Corporation: *See—*
Baron, Arthur L.; and Sivaramakrishnan, Parameswar, 4,303,776, Cl. 528-171.000.
Reinert, Gerard E., 4,303,575, Cl. 260-45.80A.
Mobil Oil Corporation: *See—*
Audeh, Costandi A., 4,303,791, Cl. 544-351.000.
Bullard, Edward M.; and Smith, Gregory M., 4,303,710, Cl. 428-35.000.
Chen, Catherine S. H.; Luh, Yuhshi; and Schmitt, Kirk D., 4,303,411, Cl. 23-230.0EP.
McHale, William D.; and Bendoraitis, Joseph G., 4,303,782, Cl. 528-416.000.
Mitchell, Thomas O.; Whitehurst, Darrell D.; and Farcasiu, Malvina, 4,303,497, Cl. 208-10.000.
Olson, Robert H., 4,303,709, Cl. 428-35.000.
Rudnick, Leslie R., 4,303,496, Cl. 208-8.0LE.
Tobias, Michael A., 4,303,565, Cl. 260-23.0CP.
Whitehurst, Darrell D.; and Yan, Tsoung Y., 4,303,494, Cl. 208-8.0LE.
Modine Manufacturing Company: *See—*
Stine, Robert E., 4,303,823, Cl. 219-75.000.
Molins Limited: *See—*
Hinchcliffe, Dennis; and Leigh, George C., 4,303,366, Cl. 414-419.000.
Molitorisz, Joseph. Method for making large rectangular bales. 4,302,923, Cl. 56-341.000.
Moller, Hilmar: *See—*
Bauer, Gunther; Burghardt, Wolfgang; and Moller, Hilmar, 4,302,929, Cl. 57-247.000.
Mollura Industries: *See—*
Finkelstein, Alberto L., 4,303,460, Cl. 156-273.000.
Molyneux, George, to Radway Plastics Limited. Damp-proof courses and structural assemblies including damp-proof courses. 4,302,916, Cl. 52-213.000.
Monsanto Company: *See—*
Chen, Gordon T., 4,303,589, Cl. 260-410.90R.
Crutchfield, Marvin M.; and Dyroff, David R., 4,303,777, Cl. 525-398.000.
Howe, Robert K.; and Lee, Len F., 4,303,439, Cl. 71-88.000.
Ridgway, James S.; Holmer, Donald A.; and Pickett, Oscar A., Jr., 4,303,577, Cl. 260-45.75C.
Snelgrove, James A., 4,303,718, Cl. 428-201.000.
Montagna, John C.: *See—*
Freel, John; Montagna, John C.; and Ryu, Seh M., 4,303,127, Cl. 166-266.000.
Montanwerke Walter GmbH: *See—*
Grusa, Arnold, 4,303,358, Cl. 408-223.000.
Montedison S.p.A.: *See—*
Ferrari, Giovanni; and Villa, Giuseppe, 4,303,491, Cl. 204-279.000.
Montgomery, Robert W.: *See—*
Smelley, Annie G.; Montgomery, Robert W.; and Hamner, Bobby J., 4,303,532, Cl. 210-732.000.
Montorio, Salvatore. Device for the remote control of the angular position of an aerial rotor. 4,303,875, Cl. 318-667.000.
Moore, Christopher H. Time-modulated delay system. 4,303,991, Cl. 364-900.000.
Moore, George E. Infinitely variable ratio transmission apparatus. 4,303,404, Cl. 474-242.000.
Morgan Actuators, Inc.: *See—*
Berry, Eddie T., 4,303,871, Cl. 318-138.000.
Morgan, John H.; and Sutton, Larry W., to GTE Automatic Electric Laboratories, Inc. Method and apparatus protecting a lens from airborne particulates. 4,303,824, Cl. 219-121.0FS.
Mori, Hideki: *See—*
Suzuki, Takashi; Akai, Shin-ichi; Mori, Hideki; Aoyagi, Katsunosuke; Shimoda, Takashi; Matsumoto, Kazuhisa; and Sasaki, Masami, 4,303,464, Cl. 156-605.000.
Mori, Toshihiro; Ando, Seigo; and Akuzawa, Hironobu, to Nippon Kokan Kabushiki Kaisha. Apparatus for detecting the center of a welded seam in accordance with fundamental harmonic component suppression. 4,303,883, Cl. 324-208.000.
Morinaga Milk Industry Co., Ltd.: *See—*
Ogasa, Katsuhiro; Kuboyama, Morio; Kuwahara, Kunisuke; Kato, Ryo; and Shimada, Hiroshi, 4,303,678, Cl. 426-46.000.
Morita, Hiroshi; and Washida, Hiroshi, to Tokyo Shibaura Denki Kabushiki Kaisha. Electrochromic display device. 4,303,310, Cl. 350-357.000.
Morita, Mike Y. Combination door stop and latching device. 4,302,864, Cl. 16-85.000.
Morley Furniture Spring Corporation: *See—*
Crosby, Lawton H., 4,303,232, Cl. 267-88.000.
Moro, Tadao; Sakamoto, Hiroshi; Yamamoto, Mitsuru; Kokubo, Toshimitsu; and Masuda, Kaoru, to Agency of Industrial Science & Technology. Hydrocyclone separator. 4,303,526, Cl. 210-512.300.
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Moser, Robert, to Rieter Machine Works, Ltd. Method and apparatus for measuring the linear density of a travelling fiber sliver. 4,302,968, Cl. 73-160.000.
Motorola Inc.: *See—*
Allgood, Robert N., 4,303,958, Cl. 361-100.000.
Bitter, Charles R., Jr.; and Hafer, Terry D., 4,303,923, Cl. 343-771.000.

Motosugi, Katsuhiko: *See*—
Nakanishi, Kiyoshi; and Motosugi, Katsuhiko, 4,303,046, Cl. 123-308.000.

Mottier, Francois M., to Otis Elevator Company. People and object counting system. 4,303,851, Cl. 235-92.0PK.

Mountz, Craig E.: *See*—
Morrison, Leonard A.; Hampton, Robert S.; Mountz, Craig E.; Murphy, John W.; and Spainhour, Phillip A., 4,303,338, Cl. 356-155.000.

Mueller Co.: *See*—
Whisenhunt, Fred S.; and Street, Lloyd J., 4,303,223, Cl. 251-357.000.

Mueller, Dale A.; and Serber, Stephen L., to Honeywell Inc. Heat pump system defrost control. 4,302,947, Cl. 62-155.000.

Mueller, Richard J. Display cabinet with stabilized rotating shelf mechanism. 4,303,283, Cl. 312-135.000.

Muller, Klaus-Peter: *See*—
Lussling, Theodor; Muller, Klaus-Peter; Schreyer, Gerd; and Theissen, Ferdinand, 4,303,621, Cl. 423-189.000.

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Munt, Irwin; Emile, Philip, Jr.; and Walden, John G., to Sangamo Weston, Inc. Gated precision offset circuit for a digital meter having a dual slope analog-to-digital converter. 4,303,880, Cl. 324-99.00D.

Munters Corporation, The: *See*—
Roe, Sheldon F., Jr., 4,303,600, Cl. 261-112.000.

Murco Environmental Limited: *See*—
Coffey, Manus, 4,303,010, Cl. 100-100.000.

Murphy, John W.: *See*—
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Murray, Billy W., to Beaird-Poulan Division Emerson Electric Co. Safety braking apparatus for portable chain saw. 4,302,879, Cl. 30-382.000.

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Mutsaers, Cornelis A. H. A.: *See*—
Boonstra, Alexander H.; and Mutsaers, Cornelis A. H. A., 4,303,742, Cl. 428-697.000.

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Tayot, Jean-Louis; and Mynard, Marie-Claude, 4,303,638, Cl. 424-32.000.

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Naegeli, Carl F. Portable fire extinguisher support. 4,303,218, Cl. 248-146.000.

Nagai, Kastumi: *See*—
Takahashi, Yuzo; Maeda, Yoshinari; Tanaka, Yasuyuki; Nagai, Kastumi; and Oyama, Shiro, 4,303,032, Cl. 113-116.0QA.

Naganawa, Hiroshi: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Naganawa, Hiroshi; and Tatsuta, Kuniaki, 4,303,785, Cl. 536-17.00A.

Nagao, Masato; Ito, Yoshiyasu; Wase, Keizou; Kazawa, Yoshiaki; and Fujinaga, Takamasa, to Hitachi, Ltd. Torus type vacuum shell. 4,303,473, Cl. 376-150.000.

Nakada, Akira: *See*—
Ueda, Akiyoshi; Kojima, Shigeru; Yasuda, Yasushi; Nishikawa, Hiroaki; and Nakada, Akira, 4,303,667, Cl. 424-274.000.

Nakagawa, Nobuo: *See*—
Miyazawa, Osamu; Oka, Hitoshi; Tanaka, Isamu; Matsuo, Akira; Yokono, Hitoshi; Nakagawa, Nobuo; and Isogai, Tokio, 4,303,443, Cl. 106-1.230.

Nakai, Yoshiharu: *See*—
Kamiya, Takashi; Tanaka, Kunihiko; Nakai, Yoshiharu; and Sakane, Kazuo, 4,303,655, Cl. 424-246.000.

Nakamura, Kiyoshi; Isaka, Masayoshi; Kurotaki, Yoshimi; and Suzuki, Yutaka, to Hitachi, Ltd. Power supply system for linear motor. 4,303,870, Cl. 318-135.000.

Nakamura, Nobuyuki: *See*—
Horikoshi, Koki; Yamamoto, Mikio; Nakamura, Nobuyuki; and Kawano, Masanobu, 4,303,787, Cl. 536-103.000.

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Nakao, Masaru: *See*—
Sasajima, Kikuo; Ono, Keiichi; Nakao, Masaru; and Yamamoto, Hisao, 4,303,663, Cl. 424-267.000.

Nakashima, Hisao: *See*—
Shimura, Naohiko; Shinada, Takeo; Ikoma, Mituga; and Nakashima, Hisao, 4,303,688, Cl. 426-513.000.

Nakayama, Masaharu; Matsushima, Masaru; Banno, Shigeki; and Kanazawa, Nobuo, to Nippon Oil and Fats Co., Ltd. Low shrinking unsaturated polyester resin composition. 4,303,762, Cl. 525-299.000.

Nalco Chemical Company: *See*—
Adams, Paul G.; and Gebler, Kenneth A., 4,303,700, Cl. 427-135.000.

Nathenson, Richard D., to Westinghouse Electric Corp. Hydrogenerator with an internally cooled rotor winding of salient pole construction. 4,303,842, Cl. 310-64.000.

National Patent Development Corporation: *See*—
D'Andrea, Mark J., 4,303,066, Cl. 128-156.000.

National Research Development Corporation: *See*—
Page, Ian, 4,303,914, Cl. 340-706.000.

National Video Group, Ltd.: *See*—
Stone, S. Gerald; Emerson, Robert M.; and Binzer, Rollin, 4,303,159, Cl. 206-387.000.

Natkin, Robert J., to Ford Motor Company. Phase controlling system for two rotatable shafts. 4,302,985, Cl. 74-403.000.

Naturin-Werk Becker & Co.: *See*—
Erk, Gayyur; and Korlatzki, Rudi, 4,303,711, Cl. 428-36.000.

NCR Corporation: *See*—
Reagan, Michael G.; and Pelkey, Bruce, 4,303,918, Cl. 340-778.000.

Necchi Societa per Azioni: *See*—
Bianchi, Nereo, 4,303,029, Cl. 112-231.000.

Negrin, Celeste. Boot to be worn after skiing. 4,302,889, Cl. 36-4.000.

Neighbor, Larry A., to BLD Products, Ltd. Vacuum control assembly. 4,303,598, Cl. 261-39.00B.

Nelson, Leonard G. Camber and caster adjusting tool. 4,303,224, Cl. 254-131.000.

Nelson, Norman A., to Upjohn Company, The. 16-Phenoxy prostaglandin $F_{2\alpha}$ analogs. 4,303,796, Cl. 560-60.000.

Nemoto, Hideyuki: *See*—
Matsuoka, Yoshitaka; Shimazoe, Michitaka; Yamamoto, Yoshimi; Ai, Mitsuo; Miyauchi, Keiji; Nemoto, Hideyuki; Tsuchiya, Masatoshi; and Tanabe, Masanori, 4,303,903, Cl. 338-4.000.

Nergard, Orv B., to Dart Industries Inc. Mug type drinking receptacle with cover and valve. 4,303,173, Cl. 220-254.000.

Neuser, Volker: *See*—
Biedermann, Jurgen; Wendel, Armin; Betzing, Hans; and Neuser, Volker, 4,303,673, Cl. 424-324.000.

Neville, Richard. Log forming machine. 4,303,111, Cl. 144-2.00R.

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Ishihara, Takeshi; and Kojima, Masaru, 4,303,799, Cl. 174-176.000.

Nibby, Chester M., Jr.: *See*—
Panepinto, William, Jr.; and Nibby, Chester M., Jr., 4,303,993, Cl. 365-230.000.

Nichols, Charles E.: *See*—
Machacek, Robert W.; Nichols, Charles E.; and Howard, John R., 4,302,862, Cl. 15-117.000.

Nickel, Bernd: *See*—
Lewin, Arthur; and Nickel, Bernd, 4,303,077, Cl. 128-777.000.

Niemann, Ralph C.; Zelipsky, Steven A.; Rezmer, Ronald R.; and Smelser, Peter, to United States of America, Energy. Method of measuring heat influx of a cryogenic transfer system. 4,302,943, Cl. 62-49.000.

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Kimura, Sakae; Shimura, Masahiro; Enokida, Kenji; and Nihei, Hideharu, 4,303,846, Cl. 313-178.000.

Nihon Shokuhini Kako Co., Ltd.: *See*—
Horikoshi, Koki; Yamamoto, Mikio; Nakamura, Nobuyuki; and Kawano, Masanobu, 4,303,787, Cl. 536-103.000.

Niita, Koyata: *See*—
Chiyomaru, Isao; Sugiyama, Hidetoshi; Niita, Koyata; Fujimori, Kunihiko; Hirano, Tadayoshi; and Tada, Osamu, 4,303,653, Cl. 424-203.000.

Ninagawa, Yoichi: *See*—
Okabe, Susumu; Omura, Yoshiaki; Ninagawa, Yoichi; and Fujita, Yoshiji, 4,303,588, Cl. 260-404.500.

Nippon Asbestos Co., Ltd.: *See*—
Aoki, Susumu; Asaumi, Hirosi; Take, Shigeo; Miyakoshi, Junichi; Takemoto, Hiroshi; and Kabayama, Kenta, 4,303,553, Cl. 252-478.000.

Nippon Electric Company, Ltd.: *See*—
Aoyama, Tsutomu, 4,303,303, Cl. 350-96.200.

Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Okumura, Takatoshi, 4,302,999, Cl. 84-1.010.
Yokoyama, Kenji; and Ida, Masaru, 4,303,889, Cl. 330-107.000.

Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See*—
Hasegawa, Masayasu; Nishikawa, Hideo; and Kotani, Yasuo, 4,303,668, Cl. 424-279.000.

Nippon Hoso Kyokai: *See*—
Ohnishi, Shunichi; Obara, Masaharu; Sakurai, Masaru; and Yamada, Hisashi, 4,303,895, Cl. 333-18.000.

Nippon Kogaku K.K.: *See*—
Matsui, Sei, 4,303,314, Cl. 350-456.000.
Nakamura, Soichi, 4,303,311, Cl. 350-427.000.

Nippon Kokan Kabushiki Kaisha: *See*—
Mori, Toshihiro; Ando, Seigo; and Akuzawa, Hironobu, 4,303,883, Cl. 324-208.000.

Nippon Mining Company Limited: *See*—
Iyama, Yukio; Fujita, Masao; and Higashiiriki, Nobuhiro, 4,303,229, Cl. 266-135.000.

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Nakayama, Masaharu; Matsushima, Masaru; Banno, Shigeki; and Kanazawa, Nobuo, 4,303,762, Cl. 525-299.000.

Nippon Soda Company Limited: *See*—
Ueda, Akiyoshi; Kojima, Shigeru; Yasuda, Yasushi; Nishikawa, Hiroaki; and Nakada, Akira, 4,303,667, Cl. 424-274.000.

Nippon Soken, Inc.: *See*—
Yasuda, Eturo; and Ohta, Minoru, 4,303,613, Cl. 422-95.000.
Yoshino, Yasuhisa; Kuno, Akira; and Shinoda, Yoshio, 4,302,973, Cl. 73-384.000.

Nippon Telegraph & Telephone Public Corp.: *See*—
Sugiyama, Kiyoshi; Matsuba, Masaharu; Iwagami, Fusao; and Fukumoto, Khoki, 4,303,928, Cl. 346-75.000.
Nishida, Yasuhiro: *See*—
Sanmi, Yasumaru; Harada, Norimichi; and Nishida, Yasuhiro, 4,303,401, Cl. 440-88.000.
Nishikawa, Hideo: *See*—
Hasegawa, Masayasu; Nishikawa, Hideo; and Kotani, Yasuo, 4,303,668, Cl. 424-279.000.
Nishikawa, Hiroaki: *See*—
Ueda, Akiyoshi; Kojima, Shigeru; Yasuda, Yasushi; Nishikawa, Hiroaki; and Nakada, Akira, 4,303,667, Cl. 424-274.000.
Nishikawa, Hiroshi: *See*—
Hino, Masamichi; and Nishikawa, Hiroshi, 4,303,139, Cl. 177-210.0FP.
Nishimura, Makoto; Omori, Yoshio; and Fujiwara, Yoshio, to Sony Corporation. Adhesive. 4,303,760, Cl. 525-117.000.
Nishio, Shigeru, to Aisin Seiki Kabushiki Kaisha. Engine rotation speed control system. 4,303,048, Cl. 123-339.000.
Nishioka, Kunihiko: *See*—
Chikata, Tsukasa; Sunami, Yoshihiko; Sasaki, Keiichi; and Nishioka, Kunihiko, 4,303,498, Cl. 208-93.000.
Nishiwaki, Kenichiro: *See*—
Takahashi, Kohki; Kondoh, Takeo; Koga, Masao; and Nishiwaki, Kenichiro, 4,303,560, Cl. 260-4.00R.
Nishiwaki, Mitsuhiro: *See*—
Hisamoto, Iwao; Maeda, Chiaki; Esaka, Takasige; and Nishiwaki, Mitsuhiro, 4,303,534, Cl. 252-3.000.
Niskin, Shale J. Water sampling device. 4,302,974, Cl. 73-864.620.
Nissan Motor Company, Limited: *See*—
Etoh, Yukihiro; Tanaka, Toshiaki; Yonezawa, Haruo; and Sakamoto, Yoshikatsu, 4,303,053, Cl. 123-568.000.
Nitta, Tsuneharu: *See*—
Tohda, Takao; Nitta, Tsuneharu; Fukuda, Yoji; Matsuoka, Tomizo; and Terada, Ziro, 4,303,913, Cl. 340-704.000.
Niwa, Senji: *See*—
Fukui, Jun; Niwa, Senji; Kawashima, Norihiro; Ueshima, Kenro; and Shimizu, Katumi, 4,303,618, Cl. 422-190.000.
Nixdorff Krein Industries, Inc.: *See*—
Mead, Harold C., 4,302,904, Cl. 47-1.500.
Nixon, Raymond F.; and Barr, Gaitskill S. Deburring apparatus. 4,303,359, Cl. 409-9.000.
Nold, Frank P.: *See*—
Lichter, Seymour; and Nold, Frank P., 4,303,602, Cl. 264-45.400.
Noll, Klaus: *See*—
Nachtkamp, Klaus; Pedain, Josef; and Noll, Klaus, 4,303,774, Cl. 528-71.000.
Nord, Paul J.: *See*—
Frank, Clyde W.; Nord, Paul J.; and Cox, Robert D., 4,303,419, Cl. 55-185.000.
Nordberg, Svein T.: *See*—
Sherwood, Robert A.; and Nordberg, Svein T., 4,303,960, Cl. 361-212.000.
Norden Laboratories, Inc.: *See*—
Davis, Eldon, 4,303,644, Cl. 424-89.000.
Nordson Corporation: *See*—
Akers, Larry D.; Scholl, Charles H.; Smith, Joseph S.; and Williams, Edward A., 4,303,108, Cl. 141-2.000.
North Atlantic Industries, Inc.: *See*—
Kramer, Joel; and Cohen, William D., 4,303,955, Cl. 360-93.000.
North Carolina State University: *See*—
Palmour, Hayne, III; Gay, Billy M.; and Cochrane, Ronald L., 4,303,448, Cl. 501-127.000.
Norton Company: *See*—
Strigle, Ralph F., Jr.; and Porter, Kenneth E., 4,303,599, Cl. 261-98.000.
Norton, Richard V.; Zehner, Lee R.; Pascoe, Ralph F.; Corn, John E., Jr.; and Grote, Dace, to Ashland Oil, Inc. Process for the production of isobutyric acid anhydride. 4,303,594, Cl. 260-546.000.
Novicky, Nick N., to Tsuetaki, George F. Oxygen permeable hard and semi-hard contact lens compositions methods and articles of manufacture. 4,303,772, Cl. 526-279.000.
Nozaki, Hisashi: *See*—
Katoh, Noboru; Komatsu, Kazumiya; and Nozaki, Hisashi, 4,303,685, Cl. 426-332.000.
Nugent, Duane C.: *See*—
Rough, Robert R., Sr.; and Nugent, Duane C., 4,303,434, Cl. 65-27.000.
N.V. Optische Industrie "De Oude Delft": *See*—
Weindanz, Herbert; and Auf dem Graben, Horst, 4,303,160, Cl. 206-455.000.
Nystrom, William C.: *See*—
Harra, David J.; and Nystrom, William C., 4,303,251, Cl. 277-236.000.
O&K Orenstein & Koppel Aktiengesellschaft Werk Lubeck: *See*—
Cassens, Dietrich; and Dowedeit, Hans-Werner, 4,303,165, Cl. 212-184.000.
O. Mustad & Son: *See*—
Etnestad, Hermann; and Laugerud, Sverre, 4,303,022, Cl. 110-245.000.
Oard, Eugene E. Two speed switch. 4,303,810, Cl. 200-5.00R.
Obara, Masaharu: *See*—
Ohnishi, Shunichi; Obara, Masaharu; Sakurai, Masaru; and Yamada, Hisashi, 4,303,895, Cl. 333-18.000.
O'Brien, Edward P. Gutter cleaning device. 4,303,348, Cl. 401-137.000.
Occidental Oil Shale, Inc.: *See*—
Ricketts, Thomas E., 4,303,273, Cl. 299-2.000.
Oda, Shoichi: *See*—
Takahashi, Hisayoshi; Oda, Shoichi; Satoh, Hiroshi; and Sakai, Itsuro, 4,302,988, Cl. 74-798.000.
Odar, Joseph, to B. F. Goodrich Company, The. Process for preparing substantially gel-free cis-1,4-polybutadiene. 4,303,769, Cl. 526-93.000.
Oettle, George W.; and Hakansson, Bo H., to Crafon Medical AB. Apparatus for measuring temperature and a method of producing same. 4,302,972, Cl. 73-362.0AR.
O'Farrell, Charles P.; and Kresge, Edward N., to Exxon Research & Engineering Co. Process for sulfonating polymers. 4,303,766, Cl. 525-353.000.
Offshore Devices, Inc.: *See*—
Milgram, Jerome H., 4,303,351, Cl. 405-66.000.
Ogasa, Katsuhiro; Kuboyama, Morio; Kuwahara, Kunisuke; Kato, Ryo; and Shimada, Hiroshi, to Morinaga Milk Industry Co., Ltd. Method of manufacturing a packaged soybean curd. 4,303,678, Cl. 426-46.000.
Ogawa, Masami: *See*—
Oyamada, Kozo; Matsui, Takashi; Tobitsuka, Junzo; Yamazaki, Yoshio; and Ogawa, Masami, 4,303,440, Cl. 71-89.000.
Ogawa, Toshihisa: *See*—
Kobashi, Mamoru; and Ogawa, Toshihisa, 4,303,977, Cl. 364-431.000.
Ogawa, Yasunao; and Ishitobi, Kaoru, to Shionogi & Co., Ltd. Method, composition and test strip for colorimetric analysis of ascorbic acid. 4,303,409, Cl. 23-230.00B.
Ohira, Toshiaki; Miyano, Reiko; and Yoshida, Ryonosuke, to Ajinomoto Company Incorporated. Method of producing improved starch by smoking. 4,303,452, Cl. 127-32.000.
Ohki, Masaharu. Toy for playing baseball game. 4,303,242, Cl. 273-93.00R.
Ohlsson, Bo E.: *See*—
Fermvik, Leif A.; Ohlsson, Bo E.; and Skinstad, Aage E., 4,302,917, Cl. 52-221.000.
Ohmori, Hitoshi: *See*—
Ono, Syoji; Sugiyama, Takashi; Kawakami, Yoshiko; Ichikawa, Yataro; Suzuki, Yoji; Ohmori, Hitoshi; and Azuma, Akiko, 4,303,664, Cl. 424-271.000.
Ohnishi, Hiroshi; Fukuyama, Hiroshi; and Yokota, Yasushi, to Bridgestone Tire Company Limited. Method of assembling a wheel tire. 4,302,966, Cl. 73-66.000.
Ohnishi, Shunichi; Obara, Masaharu; Sakurai, Masaru; and Yamada, Hisashi, to Nippon Hoso Kyokai; and Tokyo Shibaura Denki Kabushiki Kaisha. Automatic equalizer. 4,303,895, Cl. 333-18.000.
Ohno, Kosaku: *See*—
Campbell, George T. R.; Ohno, Kosaku; and Kasuga, Toshishige, 4,303,166, Cl. 212-233.000.
Ohsumi, Tadashi: *See*—
Hirano, Masachika; Ohsumi, Tadashi; Kasamatsu, Kiyoshi; and Kato, Takashi, 4,303,672, Cl. 424-304.000.
Ohta, Minoru: *See*—
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Ohtsu, Masamitsu: *See*—
Taniguchi, Hiroshi; Yano, Osahiko; Yamamitsu, Chojuro; Kitamura, Sadafumi; and Ohtsu, Masamitsu, 4,303,950, Cl. 360-19.000.
Ohtsuki, Kazuhiko: *See*—
Yano, Kazuhiko; and Ohtsuki, Kazuhiko, 4,303,400, Cl. 440-75.000.
Ohuchi, Jin: *See*—
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Oka, Hitoshi: *See*—
Miyazawa, Osamu; Oka, Hitoshi; Tanaka, Isamu; Matsuo, Akira; Yokono, Hitoshi; Nakagawa, Nobuo; and Isogai, Tokio, 4,303,443, Cl. 106-1.230.
Okabe, Akio: *See*—
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Okabe, Susumu; Omura, Yoshiaki; Ninagawa, Yoichi; and Fujita, Yoshiji, to Kuraray Co., Ltd. Farnesylacetic acid amides. 4,303,588, Cl. 260-404.500.
Okada, Fumio: *See*—
Takamizawa, Minoru; Okada, Fumio; Hara, Yasuaki; and Aoki, Hisashi, 4,303,484, Cl. 204-159.130.
Okano, Hiroshi: *See*—
Sugiyama, Matsuyoshi; and Okano, Hiroshi, 4,302,975, Cl. 73-460.000.
Okuda, Makoto: *See*—
Inoue, Isamu; Minamide, Seiko; and Okuda, Makoto, 4,303,857, Cl. 250-328.000.
Okumura, Hiroshi: *See*—
Kuwabara, Takao; Uchiyama, Hisaya; and Okumura, Hiroshi, 4,303,370, Cl. 415-17.000.
Okumura, Takatoshi, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument. 4,302,999, Cl. 84-1.010.
Okunaka, Masaaki: *See*—
Sudo, Ryoichi; Okunaka, Masaaki; Yokono, Hitoshi; Isogai, Tokio; and Yamazaki, Mitsuo, 4,303,554, Cl. 252-518.000.
Olbrechts, Guy R.: *See*—
Shaw, Jack C.; Gilbert, John F.; Olbrechts, Guy R.; and McIntyre, Melville D., 4,303,978, Cl. 364-453.000.
Olin Corporation: *See*—
Dotson, Ronald L.; and Lynch, Richard W., 4,303,624, Cl. 423-184.000.

Oliveira, Paul E., to Goodyear Tire & Rubber Company, The. Sound barrier material. 4,303,723, Cl. 428-247.000.
Ollinger, Charles G., IV. Triaxially pivotable backpack carrier. 4,303,186, Cl. 224-211.000.
O'Loughlin, Gary J.: *See—*
Jones, Francis W.; Mayfield, Robert J.; and O'Loughlin, Gary J., 4,303,652, Cl. 424-200.000.
Olsen, Robert C.: *See—*
Fitzgerald, David L.; and Olsen, Robert C., 4,303,921, Cl. 343-18.00E.
Olson, Robert H., to Mobil Oil Corporation. Coextruded laminar thermoplastic bags. 4,303,709, Cl. 428-35.000.
Olsson, Hans O. Coupling assembly. 4,303,150, Cl. 192-88.00B.
Olympus Optical Co., Ltd.: *See—*
Imai, Toshihiro; and Takase, Hiroshi, 4,303,313, Cl. 350-456.000.
Imai, Toshihiro; and Yamada, Toyotaka, 4,303,323, Cl. 354-166.000.
Kano, Tokio; and Tamagawa, Akira, 4,303,616, Cl. 422-102.000.
Ookawa, Kaneyas, 4,303,306, Cl. 350-252.000.
Sato, Masaaki, 4,303,807, Cl. 179-146.00E.
Omori, Yoshio: *See—*
Nishimura, Makoto; Omori, Yoshio; and Fujiwara, Yoshio, 4,303,760, Cl. 525-117.000.
Omura, Yoshiaki: *See—*
Okabe, Susumu; Omura, Yoshiaki; Ninagawa, Yoichi; and Fujita, Yoshiji, 4,303,588, Cl. 260-404.500.
Oncor Corporation: *See—*
Bassinger, Grey, 4,303,138, Cl. 175-296.000.
Ono, Keiichi: *See—*
Sasajima, Kikuo; Ono, Keiichi; Nakao, Masaru; and Yamamoto, Hisao, 4,303,663, Cl. 424-267.000.
Ono, Syoji; Sugiyama, Takashi; Kawakami, Yoshiko; Ichikawa, Yataro; Suzuki, Yoji; Ohmori, Hitoshi; and Azuma, Akiko, to Teijin Limited. Novel penicillin derivatives containing a coumarin nucleus and medicines containing the same. 4,303,664, Cl. 424-271.000.
Ookawa, Kaneyas, to Olympus Optical Co., Ltd. Lens assembly. 4,303,306, Cl. 350-252.000.
Opdahl, Everett W.: *See—*
Lesster, Laban E.; and Opdahl, Everett W., 4,303,902, Cl. 336-83.000.
Orange Enterprises, Inc.: *See—*
Guerndt, H. Fred, Jr.; and Thompson, Kenneth E., 4,302,922, Cl. 56-235.000.
Orfeo, Sabatino R.; Allen, Robert A.; Stiel, Leonard I.; and Pelava, John W., to Allied Corporation. Nonazeotropic refrigerant composition containing monachlorodifluoromethane, and method of use. 4,303,536, Cl. 252-67.000.
Orozovich, George E.: *See—*
Seidel, William C.; Stahl, Howard D.; and Orozovich, George E., 4,303,451, Cl. 127-32.000.
Osaki, Mikio: *See—*
Hakaridani, Mitsuhiro; Kamada, Hiroshi; Suzuki, Hitoshi; and Osaki, Mikio, 4,303,916, Cl. 340-712.000.
Osawa Precision Industries, Ltd.: *See—*
Isono, Tadao, 4,303,320, Cl. 354-25.000.
Osborne Industries, Inc.: *See—*
Thibault, Ronald M., 4,303,039, Cl. 119-52.00R.
O'Shaughnessy, Marion T.: *See—*
Johnson, Timothy W.; and O'Shaughnessy, Marion T., 4,302,965, Cl. 73-55.000.
Ostapchenko, George J., to Du Pont de Nemours, E. I., and Company. Molding blends comprising polyester, ionomer resin and grafted EPDM. 4,303,573, Cl. 260-40.00R.
Ostrup, Jan, to Wallac Oy. Device to be used in automatic gamma counters to move the samples into a measuring chamber. 4,303,858, Cl. 250-328.000.
Oswald, Jack: *See—*
Jung, Werner; and Oswald, Jack, 4,303,453, Cl. 134-10.000.
Oswald, Thomas, to International Standard Electric Corporation. Locating noise in communications systems. 4,303,808, Cl. 179-175.30F.
Oswald, Victor M.: *See—*
Trimboli Longhetto, Antonio A., 4,302,949, Cl. 62-402.000.
Otis Elevator Company: *See—*
Mottier, Francois M., 4,303,851, Cl. 235-92.0PK.
Otsuka, Katsuyuki; Ohuchi, Jin; and Arita, Shizuo, to Doryokuro Kakunenryo Kaihatsu Jigyodan; and Fujikura Rubber Works, Ltd. Method for wearing and taking off protective suit. 4,302,848, Cl. 2-2.000.
Ouellette, Norman P.: *See—*
Stolz, Robert P.; Ouellette, Norman P.; Linthorst, Johanna M.; and Herlihy, Thomas V., 4,303,686, Cl. 426-386.000.
Owen, Joseph R.: *See—*
Berke, Herbert; Allen, John H.; and Owen, Joseph R., 4,303,394, Cl. 434-40.000.
Berke, Herbert; Allen, John H.; and Owen, Joseph R., 4,303,868, Cl. 315-364.000.
Owens-Corning Fiberglas Corporation: *See—*
Eisenberg, Arnold J., 4,303,429, Cl. 65-1.000.
Houston, Robert L., 4,303,430, Cl. 65-6.000.
Owens-Illinois, Inc.: *See—*
Rough, Robert R., Sr.; and Nugent, Duane C., 4,303,434, Cl. 65-27.000.
Swartzbaugh, Peter T., 4,303,176, Cl. 220-306.000.
Oyama, Shiro: *See—*
Takahashi, Yuzo; Maeda, Yoshinari; Tanaka, Yasuyuki; Nagai, Kastumi; and Oyama, Shiro, 4,303,032, Cl. 113-116.0QA.
Oyamada, Kozo; Matsui, Takashi; Tobitsuka, Junzo; Yamazaki, Yoshio; and Ogawa, Masami, to Sankyo Company Limited. Use of isourea derivatives and triazine derivatives in combination with gibberellins as plant growth regulators. 4,303,440, Cl. 71-89.000.
P.L.G. Research Limited: *See—*
Mercer, Frank B., 4,303,714, Cl. 428-135.000.
Pagani, Hermes: *See—*
Cavalleri, Bruno; Pagani, Hermes; and Volpe, Giancarlo, 4,303,646, Cl. 424-118.000.
Page, Ian, to National Research Development Corporation. Visual display input device. 4,303,914, Cl. 340-706.000.
Palacino, Giovanni; and Radice, Angelo. Device for controlling stitch chains in sewing machines having a plurality of needles. 4,303,030, Cl. 112-286.000.
Palitex Project Company GmbH: *See—*
Franzen, Gustav, 4,302,930, Cl. 57-279.000.
Pallone, Joseph G. Insignia positioning template. 4,302,884, Cl. 33-180.00R.
Palmour, Hayne, III; Gay, Billy M.; and Cochrane, Ronald L., to North Carolina State University. Olivine refractory bricks for heat storage applications. 4,303,448, Cl. 501-127.000.
Palys, Richard F.: *See—*
Splinter, Michael R.; Palys, Richard F.; and Beguwala, Moiz M., 4,303,455, Cl. 148-1.500.
Pampus, Gottfried: *See—*
Musch, Rudiger; Schubart, Rudiger; Gobel, Wilhelm; and Pampus, Gottfried, 4,303,765, Cl. 525-343.000.
Panelfold, Inc.: *See—*
Dixon, Guy E.; and Mack, William M., Jr., 4,302,865, Cl. 16-97.000.
Panepinto, William, Jr.; and Nibby, Chester M., Jr., to Honeywell Information Systems Inc. Memory present apparatus. 4,303,993, Cl. 365-230.000.
Pangborn, Jon B., to Institute of Gas Technology. Energy storage by salt hydration. 4,303,121, Cl. 165-1.000.
Panicci, Richard L., to Kiddie Products, Inc. Self-righting training cup. 4,303,170, Cl. 220-70.000.
Panock, Richard L.: *See—*
Bjorkholm, John E.; Freeman, Richard R.; Panock, Richard L.; and Cooke, William E., 4,303,840, Cl. 307-427.000.
Papa, Sisto S.: *See—*
Marangelli, Ugo; Ciocci, Giancarlo; and Papa, Sisto S., 4,303,407, Cl. 8-643.000.
Paraisten Kalkki Oy - Pargas Kalk Ab.: *See—*
Rautilo, Matti, 4,302,918, Cl. 52-421.000.
Paret, Jacques: *See—*
Leclerc, Jean-Francois; Paret, Jacques; and Waegaert, Pierre, 4,303,081, Cl. 131-282.000.
Paridon, Leo J.; and Downing, Robert E., to PPG Industries, Inc. Aqueous carbamate dispersions. 4,303,793, Cl. 560-24.000.
Paris, Gerard Y.; Perlin, Mina D.; Pernet, Andre G.; and Shipkowitz, Nathan L., to Abbott Laboratories. Antiviral pyrazolopyrazines. 4,303,658, Cl. 424-250.000.
Parker, Donald D., to Powder River Enterprises, Inc. Livestock detaining gate. 4,302,908, Cl. 49-122.000.
Parker-Hannifin Corporation: *See—*
Swindler, Henry A., 4,303,093, Cl. 137-315.000.
Parkinson, Wayne K., to W. H. Brady Co. Kit for use in the construction of custom prototype membrane switch panels. 4,303,811, Cl. 200-5.00A.
Parmeko Limited: *See—*
McCann, John D., 4,303,910, Cl. 340-572.000.
Parr, Ehrfried: *See—*
Strack, Hans; Roebke, Wolfgang; Kneitel, Dieter; and Parr, Ehrfried, 4,303,626, Cl. 423-329.000.
Strack, Hans; Roebke, Wolfgang; Kneitel, Dieter; and Parr, Ehrfried, 4,303,627, Cl. 423-329.000.
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Strack, Hans; Roebke, Wolfgang; Kneitel, Dieter; and Parr, Ehrfried, 4,303,629, Cl. 423-329.000.
Parrish, William F.: *See—*
Fawcett, James M.; and Parrish, William F., 4,303,945, Cl. 358-222.000.
Pascal & Associates: *See—*
Bender, Joseph M., 4,303,074, Cl. 128-399.000.
Pascoe, Ralph F.: *See—*
Norton, Richard V.; Zehner, Lee R.; Pascoe, Ralph F.; Corn, John E., Jr.; and Grote, Dace, 4,303,594, Cl. 260-546.000.
Pascouet, Adrien P. Liquid slug projector apparatus. 4,303,141, Cl. 181-120.000.
Passarotti, Carlo: *See—*
Gandolfi, Carmelo; Passarotti, Carlo; Andreoni, Alessandro; Fumagalli, Angelo; Faustini, Franco; Ceserani, Roberto; and Usardi, Maria M., 4,303,670, Cl. 424-285.000.
Patel, Chandra K. N.; and Tam, Andrew C., to Bell Telephone Laboratories, Incorporated. Optoacoustic spectroscopy of condensed matter in bulk form. 4,303,343, Cl. 356-432.000.
Patrick, Milton L.: *See—*
Connolly, Terry; Patrick, Milton L.; Rudolph, Thomas E.; and Stanley, Alan, 4,303,067, Cl. 128-272.000.
Paunovic, Milan, to Kollmorgen Technologies Corporation. Heat shock resistant printed circuit board assemblies. 4,303,798, Cl. 174-68.500.
Peabody Coal Company: *See—*
McDowell, Guy, Jr., 4,303,354, Cl. 405-261.000.

Pearce, Homer L., to Eli Lilly and Company. Method of preparing vincristine. 4,303,584, Cl. 260-244.400.
Pech, Eckart, to U.S. Philips Corporation. Circuit arrangement for transferring a signal. 4,303,890, Cl. 330-257.000.
Pecoraro, Richard J.: *See—*
Helveston, Wilton L.; and Pecoraro, Richard J., 4,303,037, Cl. 114-230.000.
Pedain, Josef: *See—*
Nachtkamp, Klaus; Pedain, Josef; and Noll, Klaus, 4,303,774, Cl. 528-71.000.
Pelava, John W.: *See—*
Orfeo, Sabatino R.; Allen, Robert A.; Stiel, Leonard I.; and Pelava, John W., 4,303,536, Cl. 252-67.000.
Pelkey, Bruce: *See—*
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Pelton, Peter G.: *See—*
Ditto, Peter J.; Ellerbrock, Donald H.; and Pelton, Peter G., 4,303,190, Cl. 229-5.600.
Pennzoil Company: *See—*
Sardisco, John B.; and Phillips, Carroll O., 4,303,610, Cl. 422-61.000.
Perkins, Donald R. Tool box. 4,303,158, Cl. 206-373.000.
Perkins, Stephen P.; and Wormser, Alex F., to Wormser Engineering, Inc. Fluidized bed fuel burning. 4,303,023, Cl. 110-347.000.
Perlin, Mina D.: *See—*
Paris, Gerard Y.; Perlin, Mina D.; Pernet, Andre G.; and Shipkowitz, Nathan L., 4,303,658, Cl. 424-250.000.
Pernet, Andre G.: *See—*
Paris, Gerard Y.; Perlin, Mina D.; Pernet, Andre G.; and Shipkowitz, Nathan L., 4,303,658, Cl. 424-250.000.
Peronnet, Roland, to Societe Pyral. Magnetic recording device for providing security related information. 4,303,949, Cl. 360-2.000.
Perotti, Dino; and Perotti, Mario. Steering mechanism for bicycles, motorcycles and the like. 4,303,257, Cl. 280-279.000.
Perotti, Mario: *See—*
Perotti, Dino; and Perotti, Mario, 4,303,257, Cl. 280-279.000.
Perry, Charles B.: *See—*
Davis, Thomas J.; and Perry, Charles B., 4,303,885, Cl. 324-237.000.
Persinger, James G., to Fuel Inc. Fuel filter. 4,303,422, Cl. 55-319.000.
Persson, Kjell-Anders; and Stalfors, Lennart, to Victor Hasselblad Aktiebolag. Device for photographic cameras with focal plane shutter. 4,303,328, Cl. 354-288.000.
Persson, Per-Ake, to Stefa Industri Aktiebolag. Sealing in an adapter for available sealing grooves. 4,303,250, Cl. 277-189.000.
Pertl, Don L., to Western Automation Corporation. Apparatus for processing table and bed linen. 4,302,895, Cl. 38-15.000.
Peterson, Gary A.: *See—*
Black, Robert A.; and Peterson, Gary A., 4,303,383, Cl. 431-31.000.
Peterson, Richard H. Swell box for hybrid pipe organ. 4,303,000, Cl. 84-346.000.
Petocz, Lujza: *See—*
Berenyi nee Poldermann, Edit; Szirt nee Kiszelly, Eniko; Gorog, Peter; Petocz, Lujza; Kosoczky, Ibolya; Kovacs nee Palotai, Agnes; and Urmos nee Lassu, Gabriella, 4,303,660, Cl. 424-251.000.
Petro, Jozsef; Pungor, Erno; Toth, Klara; and Rakias, Ferenc, to Magyar Tudomanyos Akademia. Process for the preparation of highly accurate and stable electrode containing a silver salt. 4,303,740, Cl. 428-548.000.
Petrolite Corporation: *See—*
Bellos, Thomas J., 4,303,780, Cl. 528-367.000.
Petterson, Robert C.; and Loubier, Roger C. Vapor stripping process. 4,303,454, Cl. 134-11.000.
Petty, Jimmie D.: *See—*
Huckins, James N.; Stalling, David L.; Petty, Jimmie D.; and Smith, Lawrence M., 4,303,529, Cl. 210-635.000.
Pfatteicher, Bruno: *See—*
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Pfizer Inc.: *See—*
Armstrong, William W., 4,303,643, Cl. 424-80.000.
Brammer, Keith W.; and Shaw, John R., 4,303,659, Cl. 424-250.000.
Philipp, Clemens: *See—*
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Phillippi, Larry R.: *See—*
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Phillips, Carroll O.: *See—*
Sardisco, John B.; and Phillips, Carroll O., 4,303,610, Cl. 422-61.000.
Phillips Petroleum Company: *See—*
Johnson, Timothy W.; and O'Shaughnessy, Marion T., 4,302,965, Cl. 73-55.000.
Philmac Corporation: *See—*
Lux, William J., 4,303,175, Cl. 220-288.000.
Pickett, Oscar A., Jr.: *See—*
Ridgway, James S.; Holmer, Donald A.; and Pickett, Oscar A., Jr., 4,303,577, Cl. 260-45.75C.
Pierce, Percy E.: *See—*
Becher, David Z.; Christenson, Roger M.; Coalson, Richard L.; Pierce, Percy E.; and Schimmel, Karl F., 4,303,764, Cl. 525-327.000.
Pierrel, Michel; and Vitel, Jean-Pierre, to Pont-A-Mousson S.A. Large diameter pipe joint with means for distributing tensile forces. 4,303,262, Cl. 285-232.000.
Piesch, Steffen; and Wolf, Alfons, to Cassella Aktiengesellschaft. Melamine resins: process for their manufacture and the compression moulding compositions produced from the melamine resins. 4,303,561, Cl. 260-15.000.
Pilgrim, Thomas A. Building components. 4,303,722, Cl. 428-213.000.
Pinkham, Jesse R., to R. J. Reynolds Tobacco Company. Method and apparatus for transferring harvested bulk foliage from one container to another. 4,303,364, Cl. 414-26.000.
Pitchon, Esra; and Schulman, Marvin, to General Foods Corporation. Rapidly-soluble sweetener, process for its preparation and beverage mix employing it. 4,303,684, Cl. 426-312.000.
Pitkjaan, Elam: *See—*
Vile, Robert L.; and Pitkjaan, Elam, 4,303,965, Cl. 362-61.000.
Plan Hold Corporation: *See—*
Johnson, Sigurd A., 4,303,284, Cl. 312-189.000.
Platzer, George E., Jr., to Chrysler Corporation. Heated flow director. 4,303,050, Cl. 123-549.000.
Plaze, Jean P.: *See—*
Guitteny, Jean L.; Plaze, Jean P.; Roux, Michel; and Warren, Gregory N., 4,303,682, Cl. 426-250.000.
Plessey Handel und Investments AG: *See—*
Mortimer, Alan K., 4,303,920, Cl. 343-17.10R.
Plum, Dale, to Bell & Howell Company. Deskewing document feed tray. 4,303,234, Cl. 271-109.000.
Plunkett, Luther C., Jr., to Lanier Business Products, Inc. Dictation recording system. 4,303,998, Cl. 369-29.000.
Plustronix (Proprietary) Limited: *See—*
Weakley, Burton, 4,303,906, Cl. 340-52.00R.
Podhrasky, Robert J., to Garrett Electronics. Metal detector circuit with mode selection and automatic tuning. 4,303,879, Cl. 324-329.000.
Poellmann, Edgar, to TMC Corporation. Safety ski binding. 4,303,260, Cl. 280-625.000.
Poignet, Alain: *See—*
Marti, Bernard; Poignet, Alain; Fournier, Claude; and Roche, Christian, 4,303,941, Cl. 358-147.000.
Polaroid Corporation: *See—*
Campbell, John E.; and Delahunt, Robert M., 4,303,750, Cl. 430-208.000.
Campbell, John E.; and Kelly, Neal F., 4,303,751, Cl. 430-208.000.
Goodwin, Robert A.; and Allen, David V., 4,303,964, Cl. 362-16.000.
LaBelle, Theodore J.; and Sorli, Duncan C., 4,303,327, Cl. 354-276.000.
Polhemus, William B. Device for generating a curtain of high velocity gas. 4,303,373, Cl. 415-206.000.
Polysar Limited: *See—*
Guurak, Nur; and Tebbens, Klaas, 4,303,569, Cl. 260-29.7PT.
Polytronic AG: *See—*
Thalmann, Claude, 4,303,853, Cl. 235-400.000.
Pomagalski S.A.: *See—*
Tauzin, Francis, 4,303,016, Cl. 104-173.0ST.
Pommier, Jean: *See—*
Flechtner, Charles; Herbelleau, Yves; and Pommier, Jean, 4,303,115, Cl. 152-209.00R.
Pont-A-Mousson S.A.: *See—*
Pierrel, Michel; and Vitel, Jean-Pierre, 4,303,262, Cl. 285-232.000.
Pope, Brian G., to Dow Chemical Company, The. Separation and recovery of 4,4'-methylene dimethyl diphenyldicarbamate. 4,303,794, Cl. 560-25.000.
Poponiak, Michael R.: *See—*
Horng, Cheng T.; Poponiak, Michael R.; Rupprecht, Hans S.; and Schwenker, Robert O., 4,303,933, Cl. 357-50.000.
Porro, Francesco; Gabriele, Cosimo; and Hotz, Walter, to Costruzioni Aeronautiche Giovanni Agusta S.p.A. Method and device for mounting pieces inside the vacuum chamber of an electron microscope. 4,303,866, Cl. 250-442.000.
Porter, Kenneth E.: *See—*
Strigle, Ralph F., Jr.; and Porter, Kenneth E., 4,303,599, Cl. 261-98.000.
Posipanko, Thomas: *See—*
Eshbach, John R.; Felter, Richard E.; and Posipanko, Thomas, 4,303,715, Cl. 428-188.000.
Powder River Enterprises, Inc.: *See—*
Parker, Donald D., 4,302,908, Cl. 49-122.000.
Powell, Ernest R., to ENTEC Products Corporation. Flue heat recovery device. 4,303,122, Cl. 165-39.000.
Powell, George G.; and Powell, Reece J., to Sinclair & Powell Proprietary Limited. Swimming pool fence. 4,303,226, Cl. 256-25.000.
Powell Industries, Inc.: *See—*
Zerby, Lawrence G., 4,303,097, Cl. 137-599.000.
Powell, Reece J.: *See—*
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PPG Industries, Inc.: *See—*
Becher, David Z.; Christenson, Roger M.; Coalson, Richard L.; Pierce, Percy E.; and Schimmel, Karl F., 4,303,764, Cl. 525-327.000.
Carlin, William W.; and McCann, Douglas W., 4,303,487, Cl. 204-180.00PF.
Levine, Morris; Yurcheshen, Michael; and Hight, Roland W., 4,303,581, Cl. 260-18.0PF.
Paridon, Leo J.; and Downing, Robert E., 4,303,793, Cl. 560-24.000.
Sleighter, George E., 4,303,435, Cl. 65-29.000.
Pratt, Charles E.; and Colburn, Charles S., Jr., to Chattem, Inc. Grease compositions and oxyaluminum acylate intermediate compositions useful in the preparation thereof. 4,303,538, Cl. 252-37.700.

Preiser, Herman S.: *See—*
Ticker, Arthur; Preiser, Herman S.; Klemens, William; and Drake, John L., Jr., 4,303,608, Cl. 264-40.100.
Pressiat, Robert; de Corlieu, Guy; Malard, Marcel; and d'Auria, Luigi, to Thomson-CSF. Rotary-joint device providing for an optical waveguide transmission. 4,303,300, Cl. 350-96.200.
Preston, Robert M., to Eastin, David J., a part interest. Strip welding for butt joints. 4,303,821, Cl. 219-73.000.
Price, Donald R. Method for the construction of improved tire liners. 4,303,114, Cl. 152-192.000.
Prince, Jack A.; Abernathy, L. Wayne; and Caylor, L. Justin, to Jack Prince, Inc. Deboning method and apparatus. 4,303,206, Cl. 241-24.000.
Prior, John. Building component and method of making the same. 4,303,707, Cl. 427-397.000.
Process Scientific Innovations Limited: *See—*
Walker, Brian; and Merrie, Kenneth, 4,303,472, Cl. 162-221.000.
Procter & Gamble Company, The: *See—*
Llendado, Ramon A., 4,303,556, Cl. 252-527.000.
Mansy, Samir A., 4,303,543, Cl. 252-117.000.
Rose, Terence J., 4,303,557, Cl. 252-527.000.
Produits Chimiques Ugine Kuhlmann: *See—*
Schirmann, Jean-Pierre; and Delavarenne, Serge Y., 4,303,586, Cl. 260-348.310.
Schirmann, Jean-Pierre; and Delavarenne, Serge Y., 4,303,587, Cl. 260-348.310.
Psyras, Louis G. Aerodynamic toy. 4,302,901, Cl. 46-74.00D.
Puch, Claude S., to Societe Meritor. Floating device for swimming activities. 4,302,860, Cl. 9-310.00R.
Pullukat, Thomas J.; and Shida, Mitsuzo, to Chemplex Company. Method of making polymers and copolymers of 1-olefins. 4,303,770, Cl. 526-96.000.
Pun, Kwok-Wah, to Kusan, Inc. Stepping device. 4,302,903, Cl. 46-150.000.
Pungor, Erno: *See—*
Petro, Jozsef; Pungor, Erno; Toth, Klara; and Rakias, Ferenc, 4,303,740, Cl. 428-548.000.
Puydak, Robert C.: *See—*
Jansen, Deborah S.; and Puydak, Robert C., 4,303,571, Cl. 260-33.6AQ.
Quaker Oats Company, The: *See—*
De Acetis, James, 4,303,677, Cl. 426-27.000.
Irvin, Ronald D., 4,302,866, Cl. 16-171.000.
Irvin, Ronald D., 4,303,999, Cl. 369-75.000.
Queneau, Paul B.: *See—*
Huggins, Dale K.; Beckstead, Leo W.; and Queneau, Paul B., 4,303,622, Cl. 423-55.000.
Huggins, Dale K.; Queneau, Paul B.; Ziegler, Robert C.; Beckstead, Leo W.; and Hogsett, Robert F., 4,303,623, Cl. 423-55.000.
R. J. Reynolds Tobacco Company: *See—*
Pinkham, Jesse R., 4,303,364, Cl. 414-26.000.
Raccach, Moshe, to Microlife Technics, Inc. Method and bacterial compositions for fermenting meats. 4,303,679, Cl. 426-59.000.
Racz, Janos A.; and Seppi, Edward J., to General Electric Company. Tomographic scanning apparatus with ionization detector means. 4,303,863, Cl. 250-385.000.
Rademacher, Thomas P., to McNeil Corporation. Chemical dispenser for bodies of water. 4,303,515, Cl. 210-169.000.
Radice, Angelo: *See—*
Palacino, Giovanni; and Radice, Angelo, 4,303,030, Cl. 112-286.000.
Radway Plastics Limited: *See—*
Molyneux, George, 4,302,916, Cl. 52-213.000.
Ragaly, Istvan, to Robert Bosch GmbH. Semiconductor apparatus with electrically insulated heat sink. 4,303,935, Cl. 357-76.000.
Raines, Arnold; and August, William. Temperature sensitive valve. 4,303,196, Cl. 236-88.000.
Rakias, Ferenc: *See—*
Petro, Jozsef; Pungor, Erno; Toth, Klara; and Rakias, Ferenc, 4,303,740, Cl. 428-548.000.
Ramot - Tel-Aviv University: *See—*
Goldstein, Leon; Freeman, Amihay; and Sokolovsky, Mordechai, 4,303,786, Cl. 536-51.000.
Ramsey, Hubert J.; and Dakss, Mark L., to GTE Laboratories Incorporated. Piezoelectric optical switch. 4,303,302, Cl. 350-96.200.
Rasmussen, Allan E.: *See—*
Kinsey, Richard R.; Halbritter, George W.; Binsley, David L.; Rasmussen, Allan E.; and Totten, Howard Q., 4,303,898, Cl. 333-114.000.
Rast, Gustaf J., Jr.: *See—*
Barley, Thomas A.; Rast, Gustaf J., Jr.; and Ashley, James R., 4,303,899, Cl. 333-225.000.
Ratjen, Werner. Treatment of bakery products to be stored in the deep frozen state. 4,303,687, Cl. 426-497.000.
Rautilo, Matti, to Paraisten Kalkki Oy - Pargas Kalk Ab. Plug. 4,302,918, Cl. 52-421.000.
Rayner, William R. Nodal elements with channels for push-fitted rods. 4,302,900, Cl. 46-29.000.
RCA Corporation: *See—*
Goldberg, Edwin A., 4,303,893, Cl. 331-1.00A.
Kleinknecht, Hans P.; and Bosenberg, Wolfram A., 4,303,341, Cl. 356-384.000.
Stephens, Joseph W.; and Yang, Kou-Jay, 4,303,939, Cl. 358-139.000.
Wilson, Robert E., 4,303,907, Cl. 340-365.00S.
Reagan, Michael G.; and Pelkey, Bruce, to NCR Corporation. Gas panel with improved drive circuits. 4,303,918, Cl. 340-778.000.
Reau, Jean-Marie, to Societe Anonyme dite: GIPELEC. Air depolarized cell with a gelled electrolyte. 4,303,743, Cl. 429-27.000.
Red Valve Company, Inc.: *See—*
Campbell, James A., 4,303,222, Cl. 251-7.000.
Redding, Arnold H., to Westinghouse Electric Corp. Sludge collection system for a nuclear steam generator. 4,303,043, Cl. 122-382.000.
Reddy, Robert R. Pipe system including readily removable pipe link. 4,303,261, Cl. 285-31.000.
Refling, David R.: *See—*
Stensel, H. David; Maier, Peter; Biesinger, Mark G.; Refling, David R.; Klepper, Ronald P.; and Maxham, John V., 4,303,516, Cl. 210-195.400.
Refratechnik GmbH: *See—*
Bartha, Peter; and Tutsek, Alexander, 4,303,449, Cl. 501-128.000.
Regan, Ernest E.: *See—*
McCann, Thomas J.; and Regan, Ernest E., 4,303,695, Cl. 427-44.000.
Regie Nationale des Usines Renault: *See—*
Aubert, Paul, 4,302,937, Cl. 60-330.000.
Reichert, Donald G., to ABC Packaging Machine Corporation. Apparatus for forming and inserting partitions into containers. 4,303,405, Cl. 493-92.000.
Reimann, Hans; and Wildmoser, Alfred, to Linde Aktiengesellschaft. Surge control in the biological purification of wastewater. 4,303,527, Cl. 210-614.000.
Reiner, Ralph E. Automatic platen press. 4,303,011, Cl. 100-122.000.
Reinert, Gerard E., to Mobay Chemical Corporation. Flame retardant polycarbonate compositions. 4,303,575, Cl. 260-45.80A.
Reiniche, Andre: *See—*
Jarrige, Guy; and Reiniche, Andre, 4,303,119, Cl. 164-462.000.
Reip, Raymond G., to Vapor Corporation. Switching valve. 4,303,003, Cl. 91-453.000.
Rendall, John S.; and Cahalan, Maurice J., to RTL Contactor Holding S.A. Extraction process. 4,303,620, Cl. 423-6.000.
Rensselaer Polythechnic Institute: *See—*
Zelman, D. Allen, 4,303,068, Cl. 128-214.00B.
RESDEV, Inc.: *See—*
Beasley, Marvin L., 4,303,763, Cl. 525-313.000.
Retford Sheet Metal Limited: *See—*
Stokland, Sigmund, 4,303,078, Cl. 130-27.00J.
Reuschenbach, Hermann; Wirges, Winfried; and Langanke, Rolf, to Stabilus GmbH. Cylinder-and-piston rod device. 4,303,231, Cl. 267-64.150.
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Weston, David, 4,303,204, Cl. 241-16.000.
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Niemann, Ralph C.; Zelipsky, Steven A.; Rezmer, Ronald R.; and Smelser, Peter, 4,302,943, Cl. 62-49.000.
Rhodes, Melvin H., to Rockwell International Corporation. Magnetic field strength measuring apparatus. 4,303,886, Cl. 324-255.000.
Ricci, Roberto: *See—*
Dellepiane, Enrico; Ricci, Roberto; and Timossi, Giovanni, 4,303,182, Cl. 222-600.000.
Richards, Thomas E.; Harvey, James P.; and Daigle, Michael A. Rotary vacuum precoat filter. 4,303,524, Cl. 210-406.000.
Richter, Norbert: *See—*
Kruger, Bernard M., 4,303,390, Cl. 433-59.000.
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Bullock, Raymond, Jr.; Rick, Christian E.; and Schurr, George A., 4,303,702, Cl. 427-220.000.
Ricketts, Thomas E., to Occidental Oil Shale, Inc. In situ oil shale retort with a generally T-shaped vertical cross section. 4,303,273, Cl. 299-2.000.
Ridgway, James S.; Holmer, Donald A.; and Pickett, Oscar A., Jr., to Monsanto Company. Polyamide antiozonants. 4,303,577, Cl. 260-45.75C.
Riechers, Daniel: *See—*
Haberle, Fritz; Riechers, Daniel; and Heusel, Richard, 4,303,267, Cl. 293-155.000.
Riegel, Hans; and Kurzhals, Gerd, to Gebrueder Trox GmbH. Ceiling air outlet for air conditioning system. 4,303,007, Cl. 98-40.00D.
Rieter Machine Works, Ltd.: *See—*
Moser, Robert, 4,302,968, Cl. 73-160.000.
Riikonen, Pentti, to Adidas Fabrique de Chaussures de Sport. Ski binding. 4,303,259, Cl. 280-615.000.
Rikagaku Kenkyusho: *See—*
Horikoshi, Koki; Yamamoto, Mikio; Nakamura, Nobuyuki; and Kawano, Masanobu, 4,303,787, Cl. 536-103.000.
Rizla Limited: *See—*
Thompson, David K.; and Crisp, David, 4,303,082, Cl. 131-75.000.
Robert Bosch GmbH: *See—*
Grimm, Gerold; and Kemmner, Ulrich, 4,303,901, Cl. 335-272.000.
Ragaly, Istvan, 4,303,935, Cl. 357-76.000.
Sandau, Hartmut, 4,303,197, Cl. 236-92.00R.
Robert Bosch GmbH Geschaftsbereich Elektronik: *See—*
Alf, Reinhard; and Klinkwitz, Kurt, 4,303,872, Cl. 318-257.000.
Roberts, Charles A.; and Jones, Raymond D., to TII Industries, Inc. Fail safe surge arrester systems. 4,303,959, Cl. 361-124.000.
Roberts, John S., to Kling Tecs, Inc. Method of extruding polypropylene yarn. 4,303,606, Cl. 264-176.00F.
Roberts, Raymond J., to Consarc Corporation. Method and apparatus for controlling electrode drive speed in a consumable electrode furnace. 4,303,797, Cl. 13-13.000.

Robertshaw Controls Company: *See*—
Lewis, Jay L., 4,303,072, Cl. 128-276.000.
Robertson, James H. Battery powered lamp. 4,303,970, Cl. 362-203.000.
Roche, Christian: *See*—
Marti, Bernard; Poignet, Alain; Fournier, Claude; and Roche, Christian, 4,303,941, Cl. 358-147.000.
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Frankel, Milton B.; and Flanagan, Joseph E., 4,303,414, Cl. 44-63.000.
Hamermesh, Charles L.; Tung, Chiang-Ying M.; and Hogenson, Peter A., 4,303,727, Cl. 428-314.000.
Juhasz, John E.; and Krass, James E., Jr., 4,303,850, Cl. 235-92.0FP.
Rhodes, Melvin H., 4,303,886, Cl. 324-255.000.
Splinter, Michael R.; Palys, Richard F.; and Beguwala, Moiz M., 4,303,455, Cl. 148-1.500.
Weisert, Edward D.; and Agrawal, Suphal P., 4,303,570, Cl. 260-31.20R.
Rodgers, Barry E.: *See*—
Jarmell, Solomon; and Rodgers, Barry E., 4,303,615, Cl. 422-102.000.
Rodney, Burton: *See*—
Witzel, Frank; Di Nolfo, Mario A.; Rodney, Burton; and Mackay, Donald A. M., 4,303,648, Cl. 424-158.000.
Rodriguez, Jorge M., to W. R. Grace & Co. Closed cell foam printing blanket. 4,303,721, Cl. 428-213.000.
Roe, Sheldon F., Jr., to Munters Corporation, The. Reactor column. 4,303,600, Cl. 261-112.000.
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Lucian, Anton; Zwiener, Rudolf; and Roehrich, Siegfried, 4,303,107, Cl. 139-450.000.
Roepke, Wallace W.; and Anderson, Sterling J., to United States of America, Interior. Triangular shaped cutting head for use with a longwall mining machine. 4,303,277, Cl. 299-43.000.
Rohlena, Vaclav: *See*—
Maixner, Vaclav; Miklas, Zdenek; Velinsky, Frantisek; Rypka, Cestmir; Vorisek, Premysl; Rohlena, Vaclav; and Divis, Vaclav, 4,302,926, Cl. 57-58.950.
Rohloff, Joachim L. Handling means for use in handling planar objects. 4,303,161, Cl. 206-578.000.
Rohner, Peter, to Kabel-und Metallwerke Gutehoffnungshuette AG. Insulated transmission line for cryogenic media. 4,303,105, Cl. 138-149.000.
Rollei-Werke: *See*—
Tempelhof, Alfred, 4,303,317, Cl. 354-23.00D.
Rollofson, Russell L., to A-Dec, Inc. Dental handpiece with quick disconnect coupling. 4,303,392, Cl. 433-126.000.
Rolls-Royce Limited: *See*—
Driver, Ronald W., 4,303,693, Cl. 427-34.000.
Litchfield, William B.; Gent, John T.; and Graham, James A. S., 4,303,737, Cl. 428-406.000.
Rooth, Charles A.: *See*—
Drake, Charles F.; and Rooth, Charles A., 4,303,926, Cl. 346-68.000.
Rose, Terence J., to Procter & Gamble Company, The. Abrasion resistant spray dried aluminosilicate detergent composition. 4,303,557, Cl. 252-527.000.
Ross, Frank E., to Maytag Company, The. Automatic liquid level control. 4,303,406, Cl. 8-158.000.
Rossi, Quido, to Micafil AG. Process and apparatus for the production of glass foil. 4,303,436, Cl. 65-67.000.
Rothwell, Thomas F.; and Smith, Gerald B., to Dresser Industries, Inc. Corrosion resistant valve construction. 4,303,094, Cl. 137-375.000.
Rotman, Morris. Wheel dislodging tool. 4,302,873, Cl. 29-259.000.
Rottenkolber, John, to Kestenbaum, Ronald. Roller skate construction having pivotal heel. 4,303,253, Cl. 280-11.270.
Rough, Robert R., Sr.; and Nugent, Duane C., to Owens-Illinois, Inc. Method and apparatus for preheating pulverous materials prior to their introduction into a melting furnace. 4,303,434, Cl. 65-27.000.
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Deraedt, Roger; Teutsch, Jean G.; and Costerousse, Germain, 4,303,654, Cl. 424-243.000.
Martel, Jacques; Tessier, Jean; Teche, Andre; and Demoute, Jean-Pierre, 4,303,585, Cl. 260-343.30R.
Roux, Michel: *See*—
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Roy, Gerald L., to Kerr Glass Manufacturing Corporation. Linerless closure with crushable seal. 4,303,168, Cl. 215-344.000.
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Zaslavsky, Dan; and Rozenberg, Lev V., 4,303,438, Cl. 71-27.000.
RTL Contactor Holding S.A.: *See*—
Rendall, John S.; and Cahalan, Maurice J., 4,303,620, Cl. 423-6.000.
Rubin, Charles P.: *See*—
Wittmann, Alois; and Rubin, Charles P., 4,303,214, Cl. 244-158.00R.
Rubinstein, Herbert J.; and Rubinstein, Morton K. Locking device for telephone instrument. 4,303,809, Cl. 179-189.00D.
Rubinstein, Morton K.: *See*—
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Rude, Raymond C., to Arcadia Air Products. Diving board with enhanced tip performance. 4,303,238, Cl. 272-66.000.
Rudich, George, Jr.; and Matthews, Russell B., to Johnson Controls, Inc. Direct ignition system for gas appliance with DC power source. 4,303,385, Cl. 431-70.000.
Rudnick, Leslie R., to Mobil Oil Corporation. Coal liquefaction process. 4,303,496, Cl. 208-8.0LE.
Rudolph, Thomas E.: *See*—
Connolly, Terry; Patrick, Milton L.; Rudolph, Thomas E.; and Stanley, Alan, 4,303,067, Cl. 128-272.000.
Ruiz, Frank A., to AMP Incorporated. Universal optical waveguide alignment ferrule. 4,303,304, Cl. 350-96.200.
Runge, Thomas M. Electrically activated ferromagnetic/diamagnetic vascular shunt for left ventricular assist. 4,302,854, Cl. 3-1.700.
Ruppnig, Herbert, to Voest-Alpine Aktiengesellschaft. Dewatering drum. 4,303,523, Cl. 210-386.000.
Rupprecht, Hans S.: *See*—
Horng, Cheng T.; Poponiak, Michael R.; Rupprecht, Hans S.; and Schwenker, Robert O., 4,303,933, Cl. 357-50.000.
Ryder, Francis E.: *See*—
Thomas, Michael D.; and Ryder, Francis E., 4,303,828, Cl. 219-521.000.
Ryder International Corporation: *See*—
Thomas, Michael D.; and Ryder, Francis E., 4,303,828, Cl. 219-521.000.
Rypka, Cestmir: *See*—
Maixner, Vaclav; Miklas, Zdenek; Velinsky, Frantisek; Rypka, Cestmir; Vorisek, Premysl; Rohlena, Vaclav; and Divis, Vaclav, 4,302,926, Cl. 57-58.950.
Ryu, Seh M.: *See*—
Freel, John; Montagna, John C.; and Ryu, Seh M., 4,303,127, Cl. 166-266.000.
Sabatier, Jean-Jacques: *See*—
Mortier, Francois; and Sabatier, Jean-Jacques, 4,303,481, Cl. 204-25.000.
Saito, Masaaki: *See*—
Ikeura, Kenji; Saito, Masaaki; Yamane, Michiyoshi; Sanbuichi, Hiroshi; and Isobe, Akio, 4,303,049, Cl. 123-440.000.
Saito, Syuichiro: *See*—
Kiuchi, Masayoshi; and Saito, Syuichiro, 4,303,326, Cl. 354-234.000.
Saito, Toshiaki, to Suwa Seikosha Co., Ltd. Analog alarm timepiece. 4,303,997, Cl. 368-259.000.
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Kakizawa, Toshio; and Sakai, Itsuo, 4,304,003, Cl. 371-62.000.
Sakai, Itsuro: *See*—
Takahashi, Hisayoshi; Oda, Shoichi; Satoh, Hiroshi; and Sakai, Itsuro, 4,302,988, Cl. 74-798.000.
Sakai, Yuki, to Konishiroku Photo Industry Co., Ltd. Electrostatic recording apparatus. 4,303,332, Cl. 355-14.00R.
Sakamoto, Hiroshi: *See*—
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Sakamoto, Yoshikatsu: *See*—
Etoh, Yukihiro; Tanaka, Toshiaki; Yonezawa, Haruo; and Sakamoto, Yoshikatsu, 4,303,053, Cl. 123-568.000.
Sakane, Kazuo: *See*—
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Sakurai, Masaru: *See*—
Ohnishi, Shunichi; Obara, Masaharu; Sakurai, Masaru; and Yamada, Hisashi, 4,303,895, Cl. 333-18.000.
Salancy, William A.: *See*—
Eichler, Jack H.; Freeman, Mark P.; and Salancy, William A., 4,303,492, Cl. 204-300.00R.
Sallot, Louis E.: *See*—
Bourlier, Claude P.; and Sallot, Louis E., 4,303,021, Cl. 109-19.000.
Salsarulo, Angelo. Instrument for the clinical application of fillings for dental cavities. 4,303,389, Cl. 433-40.000.
Samifi Babcock, S.p.A: *See*—
La Monica, Gaspare, 4,303,009, Cl. 99-474.000.
Sanac Societa per Azioni Refrattari Argille e Caolini: *See*—
Dellepiane, Enrico; Ricci, Roberto; and Timossi, Giovanni, 4,303,182, Cl. 222-600.000.
Sanbuichi, Hiroshi: *See*—
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Sand, Ralph E.; and Johnson, Richard E., to Anderson, Clayton & Co. Proteinaceous food product. 4,303,691, Cl. 426-573.000.
Sandau, Hartmut, to Robert Bosch GmbH. Control valve. 4,303,197, Cl. 236-92.00R.
Sandberg, Inga H.: *See*—
Lindahl, Ulf P. F.; Backstrom, Gudrun E.; Thunberg, John Y. L.; Fransson, Lars-Ake; Andersson, Lars-Olov; Holmer, Erik Y.; Sandberg, Inga H.; and Soderstrom, Ewa G., 4,303,651, Cl. 424-183.000.
Sanderson, George R.: *See*—
Challen, Ian A.; East, Sandra; and Sanderson, George R., 4,303,681, Cl. 426-92.000.
Sanderson, Hendrik J., to U.S. Philips Corporation. Method of positioning reproducing elements and device for carrying out the method. 4,303,953, Cl. 360-78.000.

Sangamo Weston, Inc.: *See*—
Munt, Irwin; Emile, Philip, Jr.; and Walden, John G., 4,303,880, Cl. 324-99.00D.

Sankyo Company Limited: *See*—
Oyamada, Kozo; Matsui, Takashi; Tobitsuka, Junzo; Yamazaki, Yoshio; and Ogawa, Masami, 4,303,440, Cl. 71-89.000.

Sankyo Electric Company Limited: *See*—
Hiraga, Masaharu; and Terauchi, Kiyoshi, 4,303,379, Cl. 418-55.000.

Sanmi, Yasumaru; Harada, Norimichi; and Nishida, Yasuhiro, to Yamaha Hatsudoki Kabushiki Kaisha. Suspension means for outboard engines. 4,303,401, Cl. 440-88.000.

Sano, Kozo; Igarashi, Hideo; and Ikarashi, Takeo, to Mitsubishi Gas Chemical Company, Inc. Process for the production of carbon monoxide. 4,303,630, Cl. 423-415.00A.

Sardisco, John B.; and Phillips, Carroll O., to Pennzoil Company. Test kit for field analysis of plant tissue magnesium and calcium. 4,303,610, Cl. 422-61.000.

Sasajima, Kikuo; Ono, Keiichi; Nakao, Masaru; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. Butyrophenone compounds. 4,303,663, Cl. 424-267.000.

Sasaki, Hideaki: *See*—
Kajimura, Mutsuhiko; and Sasaki, Hideaki, 4,303,756, Cl. 521-59.000.
Kajimura, Mutsuhiko; and Sasaki, Hideaki, 4,303,757, Cl. 521-59.000.

Sasaki, Keiichi: *See*—
Chikata, Tsukasa; Sunami, Yoshihiko; Sasaki, Keiichi; and Nishioka, Kunihiko, 4,303,498, Cl. 208-93.000.

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Suzuki, Takashi; Akai, Shin-ichi; Mori, Hideki; Aoyagi, Katsunosuke; Shimoda, Takashi; Matsumoto, Kazuhisa; and Sasaki, Masami, 4,303,464, Cl. 156-605.000.

Sato, Masaaki, to Olympus Optical Co., Ltd. Ultra-small portable sound reproducing apparatus. 4,303,807, Cl. 179-146.00E.

Satoh, Hiroshi: *See*—
Takahashi, Hisayoshi; Oda, Shoichi; Satoh, Hiroshi; and Sakai, Itsuro, 4,302,988, Cl. 74-798.000.

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Satou, Kazuo; and Ueno, Mitsuhiko, to Tokyo Shibaura Electric Co., Ltd. Complementary MOSFET device and method of manufacturing the same. 4,302,875, Cl. 29-571.000.

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Buhne, Joachim; Schafer, Rolf; and Stoffel, Axel, 4,303,482, Cl. 204-129.300.
Hirsch, Peter; Wubbels, Bernhard; and Schafer, Rolf, 4,303,822, Cl. 219-73.100.

Schaffer, Max A., to Litton Systems, Inc. Analog voltage to pulse rate or analog to frequency converter. 4,303,985, Cl. 364-701.000.

Schalles, Erhard; Stender, Reinhard; and Seeger, Herbert, to Gildemeister Aktiengesellschaft. Indexable revolving turret. 4,302,870, Cl. 29-40.000.

Scheibe, Klaus, to Licentia Patent-Verwaltungs-G.m.b.H. Gas-blast power switch. 4,303,814, Cl. 200-147.00R.

Schelman, Buddy C.: *See*—
Glomski, Norman J.; and Schelman, Buddy C., 4,303,005, Cl. 92-52.000.

Schieder, Erwin; and Stoiber, Rupert, to Kraftwerk Union Aktiengesellschaft. Method of purifying tenside and detergent contaminated waste waters. 4,303,511, Cl. 210-724.000.

Schimmel, Karl F.: *See*—
Becher, David Z.; Christenson, Roger M.; Coalson, Richard L.; Pierce, Percy E.; and Schimmel, Karl F., 4,303,764, Cl. 525-327.000.

Schirmann, Jean-Pierre; and Delavarenne, Serge Y., to Produits Chimiques Ugine Kuhlmann. Catalytic epoxidation of olefins. 4,303,586, Cl. 260-348.310.

Schirmann, Jean-Pierre; and Delavarenne, Serge Y., to Produits Chimiques Ugine Kuhlmann. Catalytic epoxidation of olefins. 4,303,587, Cl. 260-348.310.

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Schlemon, George. Garment presser. 4,303,183, Cl. 223-67.000.

Schlener, J. Edward: *See*—
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Schlick, Horst-Dieter, 4,302,912, Cl. 51-418.000.

Schlumberger Technology Corporation: *See*—
Hepp, Vincent R., 4,303,975, Cl. 364-422.000.
Tanguy, Denis R., 4,303,994, Cl. 367-35.000.

Schmidt, Rudiger; and Steininger, Franz, to Babcock Krauss-Maffei Industrieanlagen GmbH. Process for the pyrolysis of waste materials. 4,303,477, Cl. 201-2.500.

Schmitt, Frederick L.: *See*—
Boden, Richard M.; Dekker, Lambert; Schmitt, Frederick L.; and Van Loveren, Augustinus G., 4,303,555, Cl. 252-522.00R.
Sprecker, Mark A.; Schmitt, Frederick L.; Vock, Manfred H.; Vinals, Joaquin F.; and Kiwala, Jacob, 4,303,725, Cl. 428-291.000.

Schmitt, Guenter: *See*—
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Schmitt, Kirk D.: *See*—
Chen, Catherine S. H.; Luh, Yuhshi; and Schmitt, Kirk D., 4,303,411, Cl. 23-230.0EP.

Schmitz, Lawrence S., to Hughes Aircraft Company. User programmable alpha-numeric message watch. 4,303,996, Cl. 368-82.000.

Schmolz, Hubert, to Voith Getriebe KG. Single-tooth gearing. 4,302,983, Cl. 74-104.000.

Schmuck, Gunter; and Wegehaupt, Dieter, to Ciba-Geigy Corporation. Process for the continuous production of wet foam laminated fabrics. 4,303,456, Cl. 156-78.000.

Schnabel, Werner: *See*—
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Schoenherr, Michael W.: *See*—
Hollis, John W., Jr.; and Schoenherr, Michael W., 4,303,562, Cl. 260-17.500.

Scholl, Charles H.: *See*—
Akers, Larry D.; Scholl, Charles H.; Smith, Joseph S.; and Williams, Edward A., 4,303,108, Cl. 141-2.000.

Schreder, Felix, to E.G.O. Elektro-Gerate Blanc u. Fischer. Connector for electric cables. 4,303,295, Cl. 339-92.00R.

Schremmer, Paul M., to Aladdin Industries Pty. Limited. Container closures. 4,303,171, Cl. 220-238.000.

Schreyer, Gerd: *See*—
Lussling, Theodor; Muller, Klaus-Peter; Schreyer, Gerd; and Theissen, Ferdinand, 4,303,621, Cl. 423-189.000.

Schubart, Rudiger: *See*—
Musch, Rudiger; Schubart, Rudiger; Gobel, Wilhelm; and Pampus, Gottfried, 4,303,765, Cl. 525-343.000.

Schulman, Marvin: *See*—
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Schurr, George A.: *See*—
Bullock, Raymond, Jr.; Rick, Christian E.; and Schurr, George A., 4,303,702, Cl. 427-220.000.

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Schuster, Willard A.: *See*—
Kodet, Reuben P.; Kohlmeier, Wayne E.; and Schuster, Willard A., 4,302,857, Cl. 5-2.00R.

Schwartz, Robert B.; Miller, Frank J.; and Vij, Hem R., to Freuhauf Corporation. Roof structure having meat rail hangers. 4,302,913, Cl. 52-39.000.

Schwartzman, Everett H. Turbine-compressor ejector. 4,303,377, Cl. 417-406.000.

Schwenker, Robert O.: *See*—
Horng, Cheng T.; Poponiak, Michael R.; Rupprecht, Hans S.; and Schwenker, Robert O., 4,303,933, Cl. 357-50.000.

Schwind, Edward C.; and Hallmark, Bobby J., to Gearhart Industries, Inc. Calibrated conduit caliper and method. 4,302,881, Cl. 33-178.00F.

Schwindt, Jurgen: *See*—
Ganster, Otto; Meiners, Hans J.; Eifler, Willi; Meyborg, Holger; and Schwindt, Jurgen, 4,303,773, Cl. 528-64.000.

Sconce, Leonard S. Log splitter and split wood loader. 4,303,112, Cl. 144-193.00A.

Scornavacca, Frank; and Bersin, Richard L., to Branson International Plasma Corporation. Process and gas for treatment of semiconductor devices. 4,303,467, Cl. 156-643.000.

Scott, Thaddeus L. Test scoring card and method of employing same. 4,303,399, Cl. 434-358.000.

Sebag, Henri: *See*—
Vanlerberghe, Guy; and Sebag, Henri, 4,303,639, Cl. 424-63.000.

Sedakov, Nikolai I.: *See*—
Bagdasarov, Khachik S.; Khaimov-Malkov, Valentin Y.; Ilin, Nikolai P.; Starostin, Jury A.; Fedorov, Evgeny A.; and Sedakov, Nikolai I., 4,303,465, Cl. 156-616.00R.

Seeger, Herbert: *See*—
Schalles, Erhard; Stender, Reinhard; and Seeger, Herbert, 4,302,870, Cl. 29-40.000.

Seely, Neil G., to Eastman Kodak Company. Roll film and a photographic camera for use therewith. 4,303,325, Cl. 354-212.000.

Seidel, William C.; Stahl, Howard D.; and Orozovich, George E., to General Foods Corporation. Method for modifying texture and flavor of waxy maize starch. 4,303,451, Cl. 127-32.000.

Seiler, Henry K.; and Sommerfeld, Eugene G., to Du Pont de Nemours, E. I., and Company. Electrocoating with water-borne coating composition made from epoxy resin, polymeric acid and tertiary amine. 4,303,488, Cl. 204-181.00R.

Seipp, William H., to Gulf & Western Industries, Inc. Programmable controller using microprocessor. 4,303,990, Cl. 364-900.000.

Seitz, Charles L.: *See*—
Stafford, Irvin G.; and Seitz, Charles L., 4,303,912, Cl. 340-703.000.

Sekisui Kaseihin Kogyo Kabushiki Kaisha: *See*—
Kajimura, Mutsuhiko; and Sasaki, Hideaki, 4,303,756, Cl. 521-59.000.
Kajimura, Mutsuhiko; and Sasaki, Hideaki, 4,303,757, Cl. 521-59.000.

Selas, George J.; and Hart, John S., to Allen-Bradley Company. Adjustment for pneumatic timer. 4,303,147, Cl. 188-298.000.

Senn, Patrice: *See—*
Bonnerot, Georges; Senn, Patrice; and Coudreuse, Michel, 4,304,000, Cl. 370-70.000.
Seppi, Edward J.: *See—*
Racz, Janos A.; and Seppi, Edward J., 4,303,863, Cl. 250-385.000.
Serber, Stephen L.: *See—*
Mueller, Dale A.; and Serber, Stephen L., 4,302,947, Cl. 62-155.000.
Sergeant, Timothy L.; and Thomas, Luz E., to Kendall Co., The. Adhesive tapes containing texturized yarns. 4,303,724, Cl. 428-229.000.
Serras-Paulet, Edouard. Control push-button device for switching an electronic or electric circuit. 4,303,856, Cl. 250-229.000.
Service d'Exploitation Industrielle des Tabacs et des Allumettes: *See—*
Leclerc, Jean-Francois; Paret, Jacques; and Waegaert, Pierre, 4,303,081, Cl. 131-282.000.
Sessler, Berthold: *See—*
Inacker, Otto; and Sessler, Berthold, 4,303,512, Cl. 219-93.000.
Shackleton, Michael A.: *See—*
Camplin, Harry R.; and Shackleton, Michael A., 4,303,423, Cl. 55-337.000.
Shafer, Nancy L.: *See—*
Slavik, John W.; and Shafer, Nancy L., 4,303,056, Cl. 126-121.000.
Shaffer, John W.: *See—*
Audesse, Emery G.; Hartman, Donald W.; and Shaffer, John W., 4,303,963, Cl. 362-15.000.
Shah, Suresh T.; Huffstutler, Miles C., Jr.; and Bentzen, Bruce D., to Medical Incorporated. Blood filter. 4,303,530, Cl. 210-651.000.
Shambaugh, John S.: *See—*
Anderson, Robert M.; Schlaikjer, Carl R.; and Shambaugh, John S., 4,303,745, Cl. 429-86.000.
Sharp Kabushiki Kaisha: *See—*
Hakaridani, Mitsuhiro; Kamada, Hiroshi; Suzuki, Hitoshi; and Osaki, Mikio, 4,303,916, Cl. 340-712.000.
Sugiyama, Kiyoshi; Matsuba, Masaharu; Iwagami, Fusao; and Fukumoto, Khoki, 4,303,928, Cl. 346-75.000.
Shaw, Daniel L. Structure for and method of reproduction. 4,303,936, Cl. 358-77.000.
Shaw, Jack C.; Gilbert, John F.; Olbrechts, Guy R.; and McIntyre, Melville D., to Boeing Company, The. Integrated-strapdown-air-data sensor system. 4,303,978, Cl. 364-453.000.
Shaw, John R.: *See—*
Brammer, Keith W.; and Shaw, John R., 4,303,659, Cl. 424-250.000.
Shaw, Wilfrid G.: *See—*
Callahan, James L.; Shaw, Wilfrid G.; and Miller, Arthur F., 4,303,550, Cl. 252-413.000.
Shean, David H. S.; and Steel, John R., to Beecham Group Limited. Spray drying process for preparation of solid sodium amoxycillin. 4,303,582, Cl. 260-239.100.
Shell, John W.; and Gale, Robert M., to ALZA Corporation. Medication indicated for ocular hypertension. 4,303,637, Cl. 424-14.000.
Shell Oil Company: *See—*
Jackson, Roy J., 4,303,579, Cl. 260-45.95E.
Jackson, Roy J., Jr., 4,303,576, Cl. 260-45.9QB.
Shepard, Steve A.: *See—*
Haag, George A.; Fogg, O. Douglas; Greenley, Gordon A.; Shepard, Steve A.; and Terry, F. Duncan, 4,303,987, Cl. 364-900.000.
Shepherd, Michael, to Wallace Murray Corporation. Plastic hub torsional vibration damper. 4,302,986, Cl. 74-574.000.
Sherwood, Robert A.; and Nordberg, Svein T., to GTE Products Corporation. Electrostatic discharge-protected switch. 4,303,960, Cl. 361-212.000.
Sheu, Jin Y. Vacuum insulated, heat retaining, liquid dispensing bottle. 4,303,180, Cl. 222-204.000.
Shibayama, Daigoro, to Yamato Setsubi Koji Kabushiki Kaisha. Purification treatment of a liquid waste. 4,303,528, Cl. 210-615.000.
Shida, Mitsuzo: *See—*
Pullukat, Thomas J.; and Shida, Mitsuzo, 4,303,770, Cl. 526-96.000.
Shimada, Hiroshi: *See—*
Ogasa, Katsuhiro; Kuboyama, Morio; Kuwahara, Kunisuke; Kato, Ryo; and Shimada, Hiroshi, 4,303,678, Cl. 426-46.000.
Shimano Industrial Company, Limited: *See—*
Takeda, Nobumi, 4,302,987, Cl. 74-594.600.
Shimazaki, Tetsuro; and Kamei, Shun, to Mitsubishi Paper Mills, Ltd. Process for coating dispersed minute droplets with membrane. 4,303,548, Cl. 252-316.000.
Shimazoe, Michitaka: *See—*
Matsuoka, Yoshitaka; Shimazoe, Michitaka; Yamamoto, Yoshimi; Ai, Mitsuo; Miyauchi, Keiji; Nemoto, Hideyuki; Tsuchiya, Masatoshi; and Tanabe, Masanori, 4,303,903, Cl. 338-4.000.
Shimizu, Katumi: *See—*
Fukui, Jun; Niwa, Senji; Kawashima, Norihiro; Ueshima, Kenro; and Shimizu, Katumi, 4,303,618, Cl. 422-190.000.
Shimizu, Kenichi; Kamiya, Akihiro; Yamazaki, Shu; Akiyama, Riozo; Makuuchi, Teruji; and Yoshizaki, Shiichiro, to Toshiba Corporation. Discharge lamp and method of making same. 4,303,848, Cl. 313-346.00R.
Shimoda, Mitsuhiko: *See—*
Enomoto, Shigeo; and Shimoda, Mitsuhiko, 4,303,321, Cl. 354-25.000.
Shimoda, Takashi: *See—*
Suzuki, Takashi; Akai, Shin-ichi; Mori, Hideki; Aoyagi, Katsunosuke; Shimoda, Takashi; Matsumoto, Kazuhisa; and Sasaki, Masami, 4,303,464, Cl. 156-605.000.
Shimodaira, Tadayoshi, to Kabushiki Kaisha Suwa Seikosha; and Shinsu Seika Kabushiki Kaisha. Micro-printer with unitary plastic frame. 4,303,013, Cl. 101-99.000.
Shimura, Masahiro: *See—*
Kimura, Sakae; Shimura, Masahiro; Enokida, Kenji; and Nihei, Hideharu, 4,303,846, Cl. 313-1[illegible]8.000.
Shimura, Naohiko; Shinada, Takeo; Ikoma, Mituga; and Nakashima, Hisao, to Kibun Company Limited. Method of producing fibrous fish paste. 4,303,688, Cl. 426-513.000.
Shin-Etsu Chemical Co., Ltd.: *See—*
Takamizawa, Minoru; Okada, Fumio; Hara, Yasuaki; and Aoki, Hisashi, 4,303,484, Cl. 204-159.130.
Shinada, Takeo: *See—*
Shimura, Naohiko; Shinada, Takeo; Ikoma, Mituga; and Nakashima, Hisao, 4,303,688, Cl. 426-513.000.
Shindelar, Aloysius C., to Deere & Company. Female coupler. 4,303,098, Cl. 137-614.060.
Shinoda, Yoshio: *See—*
Yoshino, Yasuhisa; Kuno, Akira; and Shinoda, Yoshio, 4,302,973, Cl. 73-384.000.
Shinsu Seika Kabushiki Kaisha: *See—*
Shimodaira, Tadayoshi, 4,303,013, Cl. 101-99.000.
Shionogi & Co., Ltd.: *See—*
Ogawa, Yasunao; and Ishitobi, Kaoru, 4,303,409, Cl. 23-230.00B.
Shipkowitz, Nathan L.: *See—*
Paris, Gerard Y.; Perlin, Mina D.; Pernet, Andre G.; and Shipkowitz, Nathan L., 4,303,658, Cl. 424-250.000.
Shoemaker, Loren R. Front opening holster. 4,303,185, Cl. 224-193.000.
Shoemaker, Stephen P., Jr.; and Brashear, Foster M. Manually directed coin game. 4,303,248, Cl. 273-356.000.
Sibaoka, Hazime: *See—*
Hisano, Katsukuni; Isa, Hitoshi; and Sibaoka, Hazime, 4,303,369, Cl. 415-1.000.
Sieber, Werner: *See—*
Hehn, Wilfried; Kurths, Siegfried; Sieber, Werner; and Kocourek, Franz, 4,303,330, Cl. 354-319.000.
Siegenthaler, Fritz, to Autelca AG. Matrix printer carriage arrangement. 4,303,347, Cl. 400-354.000.
Siekmann, Rem, to Baxter Travenol Laboratories, Inc. Flow metering cassette and controller. 4,303,376, Cl. 417-360.000.
Siemens Aktiengesellschaft: *See—*
Drebinger, Peter, 4,303,905, Cl. 340-41.00R.
Dull, Hans-Jurgen, 4,303,017, Cl. 104-294.000.
Heinzelmann, Karl G.; Schmitt, Guenter; and Tschunt, Edgar, 4,303,830, Cl. 250-445.00T.
Johannsen, Rolf, 4,303,932, Cl. 357-48.000.
Lewin, Arthur; and Nickel, Bernd, 4,303,077, Cl. 128-777.000.
von der Neyen, Hans J., 4,304,004, Cl. 375-88.000.
Sigma Plastique: *See—*
Tauzin, Francis, 4,303,016, Cl. 104-173.0ST.
Silverman, Daniel; and Johnson, Everett A. Access security control. 4,303,852, Cl. 235-382.000.
Sime, John T.; and Ainsworth, Anthony T., to Beecham Group Limited. Aminomethyl chromans. 4,303,656, Cl. 424-248.400.
Simmons, Gerald C.: *See—*
Bolender, John W.; and Simmons, Gerald C., 4,303,213, Cl. 244-137.00R.
Simon, Eli. Self-extinguishing cigarettes. 4,303,084, Cl. 131-349.000.
Simonetti, Alex: *See—*
Gini, Donald; Larson, Theodore L.; Merten, Ronald A.; and Simonetti, Alex, 4,303,738, Cl. 428-423.100.
Simpson, Ronald O.: *See—*
James, Bobby D.; Simpson, Ronald O.; and Starling, J. David, 4,303,337, Cl. 356-72.000.
Sinclair & Powell Proprietary Limited: *See—*
Powell, George G.; and Powell, Reece J., 4,303,226, Cl. 256-25.000.
Singer Company, The: *See—*
Graham, Thomas G., 4,303,031, Cl. 112-316.000.
Membrino, Robert J.; and Gilbreath, George D., Jr., 4,303,989, Cl. 364-900.000.
Sircar, Anup: *See—*
Buchanan, Relva C.; DeFord, H. Dale; and Sircar, Anup, 4,303,447, Cl. 501-103.000.
Sisson, Edwin D.; and Spehr, Carl J., to IRD Mechanalysis, Inc. Vibration severity indicator. 4,302,977, Cl. 73-658.000.
Sitte, Hellmuth, to C. Reichert Optische Werke, AG. Device for metallic mirror-cryofixation and subsequent cryopreparation of biological materials. 4,302,950, Cl. 62-514.00R.
Sivaramakrishnan, Parameswar: *See—*
Baron, Arthur L.; and Sivaramakrishnan, Parameswar, 4,303,776, Cl. 528-171.000.
Skinner, Robert T. J., to Lucas Industries Limited. Valve for fuel pumping apparatus. 4,303,096, Cl. 137-512.000.
Skinstad, Aage E.: *See—*
Fermvik, Leif A.; Ohlsson, Bo E.; and Skinstad, Aage E., 4,302,917, Cl. 52-221.000.
Skoog, Malte, to Alfa-Laval AB. Plate heat exchanger. 4,303,123, Cl. 165-166.000.
Skrentner, Frank C., to F. Jos. Lamb Company. Piston turning machine. 4,302,992, Cl. 82-19.000.
Skretting, Arne, to Kamyr Aktiebolag. Screening device. 4,303,508, Cl. 209-297.000.
Slabinski, Chet J., to Babcock & Wilcox Company, The. Wide range data cable equalizer. 4,303,896, Cl. 333-28.00R.
Slavik, John W.; and Shafer, Nancy L. Fireplace closures. 4,303,056, Cl. 126-121.000.
Sleighter, George E., to PPG Industries, Inc. Glass ribbon float tank with a pyrometer assembly having a heated viewing tube and method of use. 4,303,435, Cl. 65-29.000.

Small World Exchange, Inc.: *See*—
Johnson, Avery R.; and Harrison, John M., 4,303,804, Cl. 179-18.0BC.

Smart, David C.; and Black, Paul F., to Eastman Kodak Company. Socket structure for electrical components. 4,303,297, Cl. 339-218.00M.

Smelley, Annie G.; Montgomery, Robert W.; and Hamner, Bobby J., to United States of America, Interior. Dewatering of slimes. 4,303,532, Cl. 210-732.000.

Smelser, Peter: *See*—
Niemann, Ralph C.; Zelipsky, Steven A.; Rezmer, Ronald R.; and Smelser, Peter, 4,302,943, Cl. 62-49.000.

Smith, David W.: *See*—
Elkins, Christopher W.; Smith, David W.; and Trenary, John, 4,303,201, Cl. 239-383.000.

Smith, Dennis M.: *See*—
Lewis, William R.; Smith, Dennis M.; and Jenness, Wendell G., 4,303,181, Cl. 222-591.000.

Smith, Gerald B.: *See*—
Rothwell, Thomas F.; and Smith, Gerald B., 4,303,094, Cl. 137-375.000.

Smith, Gregory M.: *See*—
Bullard, Edward M.; and Smith, Gregory M., 4,303,710, Cl. 428-35.000.

Smith International, Inc.: *See*—
Ball, Harry N., 4,303,136, Cl. 175-329.000.
Fischer, John F., 4,303,137, Cl. 175-374.000.

Smith, Joseph S.: *See*—
Akers, Larry D.; Scholl, Charles H.; Smith, Joseph S.; and Williams, Edward A., 4,303,108, Cl. 141-2.000.

Smith, Lawrence M.: *See*—
Huckins, James N.; Stalling, David L.; Petty, Jimmie D.; and Smith, Lawrence M., 4,303,529, Cl. 210-635.000.

Smith, Marvin M. Jet engine augmentor operation at high altitudes. 4,302,933, Cl. 60-261.000.

Smith, Peter H., to General Electric Company. Microwave oven humidity sensing arrangement. 4,303,818, Cl. 219-10.55B.

Smith, Philip E., to Baxa Corporation. Syringe-type liquid container dispenser adapter. 4,303,071, Cl. 128-272.300.

Smith, Wedad J., to Wrex-All Implements, Inc. Scraper-sifter and distributing device. 4,303,507, Cl. 209-252.000.

Smith, William G.: *See*—
Kehrer, Gerald P.; and Smith, William G., 4,303,735, Cl. 428-391.000.

Snarski, Thomas R., to General Motors Corporation. Apparatus for heat treating containing air-purged molecular sieves in $O_2$-free $N_2$atmospheres. 4,303,228, Cl. 266-96.000.

Snelgrove, James A., to Monsanto Company. Printing ink formulations. 4,303,718, Cl. 428-201.000.

Snider, Philip A., to Cooper Industries, Inc. Chuck for rotary tool. 4,303,252, Cl. 279-35.000.

Snitzer, Elias; and Glenn, William H., to United Technologies Corporation. Optical temperature probe employing rare earth absorption. 4,302,970, Cl. 73-339.00R.

Societe Anonyme DBA: *See*—
Kervagoret, Gilbert, 4,303,099, Cl. 137-625.210.

Societe Anonyme dite: GIPELEC: *See*—
Reau, Jean-Marie, 4,303,743, Cl. 429-27.000.

Societe Anonyme dite: l'Oreal: *See*—
Vanlerberghe, Guy; and Sebag, Henri, 4,303,639, Cl. 424-63.000.

Societe Chauvin Arnoux: *See*—
Arnoux, Daniel; Koehler, Gerard; Leconte, Andre; Genter, Claude; and Michel, Bernard, 4,303,843, Cl. 310-67.00R.

Societe d'Assistance Technique pour Produits Nestle S.A.: *See*—
Hidalgo, Jaime; Wenner, Valentin; and Forni, Francoise, 4,303,580, Cl. 260-113.000.

Societe Franco-Americaine de Construction Atomiques-Framtome: *See*—
Leclercq, Joseph, 4,303,476, Cl. 376-446.000.

Societe Legris France S.A.: *See*—
Legris, Andre, 4,303,263, Cl. 285-249.000.

Societe Meritor: *See*—
Puch, Claude S., 4,302,860, Cl. 9-310.00R.

Societe Pyral: *See*—
Peronnet, Roland, 4,303,949, Cl. 360-2.000.

Societe Samibem, S.A.: *See*—
Weber, Marcel, 4,302,921, Cl. 56-13.600.

Soderstrom, Ewa G.: *See*—
Lindahl, Ulf P. F.; Backstrom, Gudrun E.; Thunberg, John Y. L.; Fransson, Lars-Ake; Andersson, Lars-Olov; Holmer, Erik Y.; Sandberg, Inga H.; and Soderstrom, Ewa G., 4,303,651, Cl. 424-183.000.

Sokolovsky, Mordechai: *See*—
Goldstein, Leon; Freeman, Amihay; and Sokolovsky, Mordechai, 4,303,786, Cl. 536-51.000.

Someya, Hiromi, to Canon Kabushiki Kaisha. Electronic image pick-up device for a single-lens reflex camera having an interchangeable finder. 4,303,322, Cl. 354-31.000.

Sommer, Klaus: *See*—
Wasel-Nielen, Joachim; Merkenich, Karl; Gehrig, Oskar, deceased; and Sommer, Klaus, 4,303,541, Cl. 252-70.000.

Sommerfeld, Eugene G.: *See*—
Seiler, Henry K.; and Sommerfeld, Eugene G., 4,303,488, Cl. 204-181.00R.

Sommerhalter, Frederick, Jr.: *See*—
McMorrow, John J.; Kaplan, Harold; and Sommerhalter, Frederick, Jr., 4,302,956, Cl. 70-312.000.

Song, Won R., to Exxon Research & Engineering Co. Oil additives containing a thiocarbamyl moiety. 4,303,539, Cl. 252-47.000.

Sonley, John M., to Diffracto Ltd. Gas sensitive devices. 4,303,612, Cl. 422-94.000.

Sony Corporation: *See*—
Ishikawa, Yuho, 4,303,815, Cl. 200-330.000.
Nishimura, Makoto; Omori, Yoshio; and Fujiwara, Yoshio, 4,303,760, Cl. 525-117.000.
Tamura, Hideo, 4,303,699, Cl. 427-132.000.

Sorli, Duncan C.: *See*—
LaBelle, Theodore J.; and Sorli, Duncan C., 4,303,327, Cl. 354-276.000.

Southwire Company: *See*—
Sullivan, Roy E., 4,303,734, Cl. 428-368.000.

Spainhour, Phillip A.: *See*—
Morrison, Leonard A.; Hampton, Robert S.; Mountz, Craig E.; Murphy, John W.; and Spainhour, Phillip A., 4,303,338, Cl. 356-155.000.

Spaulding, Tedford H., to Bunker Ramo Corporation. Modular interface connector. 4,303,296, Cl. 339-122.00R.

Spayd, Richard W.: *See*—
Kim, Sang H.; and Spayd, Richard W., 4,303,408, Cl. 23-230.00B.

Spehr, Carl J.: *See*—
Sisson, Edwin D.; and Spehr, Carl J., 4,302,977, Cl. 73-658.000.

Spencer Wright Industries, Inc.: *See*—
Bardsley, Harold B., 4,303,024, Cl. 112-79.00R.
Bardsley, Harold B., 4,303,025, Cl. 112-79.00R.

Sperry Corporation: *See*—
Levine, Seymour; and Wing, Willis G., 4,302,885, Cl. 33-228.000.

Spindelfabrik Sussen, Schurr, Stahlecker und Grill GmbH: *See*—
Stahlecker, Hans, 4,302,928, Cl. 57-130.000.

Spitze, Leroy A.: *See*—
United States of America, National Aeronautics and Space Administration; Wydeven, Theodore; Wood, Peter C.; Ballou, Edward V.; and Spitze, Leroy A., 4,303,961, Cl. 361-230.000.

Splinter, Michael R.; Palys, Richard F.; and Beguwala, Moiz M., to Rockwell International Corporation. Low temperature microwave annealing of semiconductor devices. 4,303,455, Cl. 148-1.500.

Sprague Devices, Inc.: *See*—
Green, Charles J.; and Forsythe, Alan K., 4,303,088, Cl. 137-102.000.

Sprague, Peter W., to E. R. Squibb & Sons, Inc. Carboxyacyl, mercapto and acylmercapto derivatives of heterobicyclo compounds. 4,303,662, Cl. 424-256.000.

Sprecker, Mark A.; Schmitt, Frederick L.; Vock, Manfred H.; Vinals, Joaquin F.; and Kiwala, Jacob, to International Flavors & Fragrances Inc. Process for augmenting or enhancing aroma of headspace in dryer using fabric softener article containing 2-oxabicyclooctane derivative. 4,303,725, Cl. 428-291.000.

Spring, Arthur; and Baehr, Arthur, to Buchi Laboratoriums-Technik AG. Distilling unit. 4,303,614, Cl. 422-101.000.

Spring, Carl E., to La Crosse Cooler Company. High density can stack for automatic can venders. 4,303,179, Cl. 221-7.000.

Springborn, Karl S., to Austung Proprietary Limited. Process and apparatus for the manufacture of sintered tungsten carbide tool tips. 4,303,416, Cl. 51-293.000.

Stabilus GmbH: *See*—
Reuschenbach, Hermann; Wirges, Winfried; and Langanke, Rolf, 4,303,231, Cl. 267-64.150.

Stacey, Eric J.; Baker, Donal E.; Doughman, Charles L.; and Jessee, Ralph D., to Westinghouse Electric Corp. Controlling the circulating current in naturally commutated static power converters. 4,303,972, Cl. 363-10.000.

Stafford, Irvin G.; and Seitz, Charles L., to Burroughs Corporation. Digitally controlled composite color video display system. 4,303,912, Cl. 340-703.000.

Stahl, Francis: *See*—
Kelly, William T., III; and Stahl, Francis, 4,303,876, Cl. 320-2.000.

Stahl, Howard D.: *See*—
Seidel, William C.; Stahl, Howard D.; and Orozovich, George E., 4,303,451, Cl. 127-32.000.

Stahl, Norman O. Ocular massage device. 4,303,063, Cl. 128-25.00A.

Stahlecker, Hans, to Spindelfabrik Sussen, Schurr, Stahlecker und Grill GmbH. Spinning or twisting spindle with a one-piece spindle top and methods for manufacturing same. 4,302,928, Cl. 57-130.000.

Stalfors, Lennart: *See*—
Persson, Kjell-Anders; and Stalfors, Lennart, 4,303,328, Cl. 354-288.000.

Stalling, David L.: *See*—
Huckins, James N.; Stalling, David L.; Petty, Jimmie D.; and Smith, Lawrence M., 4,303,529, Cl. 210-635.000.

Standard Oil Company: *See*—
Callahan, James L.; Shaw, Wilfrid G.; and Miller, Arthur F., 4,303,550, Cl. 252-413.000.

Stanley, Alan: *See*—
Connolly, Terry; Patrick, Milton L.; Rudolph, Thomas E.; and Stanley, Alan, 4,303,067, Cl. 128-272.000.

Stanley, John P., Jr. Damage control craft. 4,303,036, Cl. 114-227.000.

Starling, J. David: *See*—
James, Bobby D.; Simpson, Ronald O.; and Starling, J. David, 4,303,337, Cl. 356-72.000.

Starostin, Jury A.: *See—*
Bagdasarov, Khachik S.; Khaimov-Malkov, Valentin Y.; Ilin, Nikolai P.; Starostin, Jury A.; Fedorov, Evgeny A.; and Sedakov, Nikolai I., 4,303,465, Cl. 156-616.00R.

Starr, George N., to Fournet, Robert L. Gyroscopic directional surveying instrument. 4,302,886, Cl. 33-312.000.

Stauffer Chemical Company: *See—*
Lam, Hsaio-Ling, 4,303,792, Cl. 548-215.000.

Steel, John R.: *See—*
Shean, David H. S.; and Steel, John R., 4,303,582, Cl. 260-239.100.

Stefa Industri Aktiebolag: *See—*
Persson, Per-Ake, 4,303,250, Cl. 277-189.000.

Steffens, Bert. Process for the continuous separation of discarded hygiene articles into their components. 4,303,501, Cl. 209-2.000.

Stein Surface: *See—*
Garcelon, Jean P., 4,303,437, Cl. 65-99.00A.

Steininger, Franz: *See—*
Schmidt, Rudiger; and Steininger, Franz, 4,303,477, Cl. 201-2.500.

Stelle, James M.: *See—*
Thompson, William P.; and Stelle, James M., 4,303,041, Cl. 119-96.000.

Stenberg, Kaj O., to Gambro AB. Method of joining conduits with a connecting piece and connecting piece for use in the method. 4,303,458, Cl. 156-158.000.

Stender, Reinhard: *See—*
Schalles, Erhard; Stender, Reinhard; and Seeger, Herbert, 4,302,870, Cl. 29-40.000.

Stensel, H. David; Maier, Peter; Biesinger, Mark G.; Refling, David R.; Klepper, Ronald P.; and Maxham, John V., to Envirotech Corporation. Orbital wastewater treatment system with integral clarification. 4,303,516, Cl. 210-195.400.

Stenzenberger, Horst, to Technochemie GmbH-Verfahrenstechnik. Thermosetting imide resins from dihydrazide. 4,303,779, Cl. 528-312.000.

Stephens, Joseph W.; and Yang, Kou-Jay, to RCA Corporation. Horizontal stability measurement apparatus. 4,303,939, Cl. 358-139.000.

Stephenson, Robert L., to Allied Corporation. Tension reducer for dual spool retractor. 4,303,209, Cl. 242-107.40A.

Stiel, Leonard I.: *See—*
Orfeo, Sabatino R.; Allen, Robert A.; Stiel, Leonard I.; and Pelava, John W., 4,303,536, Cl. 252-67.000.

Stine, Robert E., to Modine Manufacturing Company. Welding device. 4,303,823, Cl. 219-75.000.

Stitt, Robert M., to Burr-Brown Research Corp. Molded lead frame dual in line package including a hybrid circuit. 4,303,934, Cl. 357-14.000.

Stocks, Gerald R., to Apcoa, Inc. Parking garage construction. 4,302,915, Cl. 52-175.000.

Stoffel, Axel: *See—*
Buhne, Joachim; Schafer, Rolf; and Stoffel, Axel, 4,303,482, Cl. 204-129.300.

Stoffel, James C., to Xerox Corporation. Image interpolation system. 4,303,947, Cl. 358-260.000.

Stoiber, Rupert: *See—*
Schieder, Erwin; and Stoiber, Rupert, 4,303,511, Cl. 210-724.000.

Stokland, Sigmund, to Retford Sheet Metal Limited. Agricultural machine. 4,303,078, Cl. 130-27.00J.

Stoll, Max: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 4,303,689, Cl. 426-537.000.

Stolz, Robert P.; Ouellette, Norman P.; Linthorst, Johanna M.; and Herlihy, Thomas V., to General Foods Corporation. Process for reducing acid content steamed coffee. 4,303,686, Cl. 426-386.000.

Stone, S. Gerald; Emerson, Robert M.; and Binzer, Rollin, to National Video Group, Ltd. Video package. 4,303,159, Cl. 206-387.000.

Stone, W. James; and Stoutmeyer, Ronald G., to United States of America, Navy. Vertical seeking aircrew escape system. 4,303,212, Cl. 244-122.0AD.

Stottmann, Richard L.; and Eisenbeis, Edwin C., to General Electric Company. Capacitative apparatus for thawing frozen food in a refrigeration appliance. 4,303,820, Cl. 219-10.810.

Stoutmeyer, Ronald G.: *See—*
Stone, W. James; and Stoutmeyer, Ronald G., 4,303,212, Cl. 244-122.0AD.

Stover, Kenneth W., to Bunn-O-Matic Corporation. Brewing funnel. 4,303,525, Cl. 210-455.000.

Strack, Hans; Roebke, Wolfgang; Kneitel, Dieter; and Parr, Ehrfried, to Degussa & Henkel Kommanditgesellschaft auf Aktien. Crystalline zeolite powder of type A (V). 4,303,626, Cl. 423-329.000.

Strack, Hans; Roebke, Wolfgang; Kneitel, Dieter; and Parr, Ehrfried, to Degussa & Henkel Kommanditgesellschaft auf Aktien. Crystalline zeolite powder of type A (VI). 4,303,627, Cl. 423-329.000.

Strack, Hans; Roebke, Wolfgang; Kneitel, Dieter; and Parr, Ehrfried, to Degussa & Henkel Kommanditgesellschaft auf Aktien. Crystalline zeolite powder of type A (IV). 4,303,628, Cl. 423-329.000.

Strack, Hans; Roebke, Wolfgang; Kneitel, Dieter; and Parr, Ehrfried, to Degussa & Henkel Kommanditgesellschaft auf Aktien. Crystalline zeolite powder of type A (I). 4,303,629, Cl. 423-329.000.

Street, Lloyd J.: *See—*
Whisenhunt, Fred S.; and Street, Lloyd J., 4,303,223, Cl. 251-357.000.

Strigle, Ralph F., Jr.; and Porter, Kenneth E., to Norton Company. Tower packing. 4,303,599, Cl. 261-98.000.

Strongin, Ned. Table game. 4,303,246, Cl. 273-271.000.

Styles, Virgil L.: *See—*
Morrison, Robert W., Jr.; Mallory, William R.; and Styles, Virgil L., 4,303,789, Cl. 544-323.000.
Morrison, Robert W., Jr.; Mallory, William R.; and Styles, Virgil L., 4,303,790, Cl. 544-323.000.

Subera, Elmer: *See—*
Ibraham, Fayez F.; Subera, Elmer; and deBruyn, William, 4,302,948, Cl. 62-256.000.

Sudarev, Anatoly V.: *See—*
Kuznetsov, Andrei L.; Sudarev, Anatoly V.; Ivakhnenko, Viktor V.; Lamm, Jury A.; Maev, Vladimir A.; and Zakharov, Jury I., 4,302,932, Cl. 60-39.320.

Sudo, Ryoichi; Okunaka, Masaaki; Yokono, Hitoshi; Isogai, Tokio; and Yamazaki, Mitsuo, to Hitachi, Ltd.; and Hitachi Chemical Company, Ltd. Composition and process for producing transparent conductive film. 4,303,554, Cl. 252-518.000.

Sugiyama, Hidetoshi: *See—*
Chiyomaru, Isao; Sugiyama, Hidetoshi; Niita, Koyata; Fujimori, Kunihiko; Hirano, Tadayoshi; and Tada, Osamu, 4,303,653, Cl. 424-203.000.

Sugiyama, Kiyoshi; Matsuba, Masaharu; Iwagami, Fusao; and Fukumoto, Khoki, to Nippon Telegraph & Telephone Public Corp.; and Sharp Kabushiki Kaisha. Printer head assembly for an ink jet system printer of the charge amplitude controlling type. 4,303,928, Cl. 346-75.000.

Sugiyama, Matsuyoshi; and Okano, Hiroshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Device for holding a rotor body in a balance testor. 4,302,975, Cl. 73-460.000.

Sugiyama, Takashi: *See—*
Ono, Syoji; Sugiyama, Takashi; Kawakami, Yoshiko; Ichikawa, Yataro; Suzuki, Yoji; Ohmori, Hitoshi; and Azuma, Akiko, 4,303,664, Cl. 424-271.000.

Sullivan, Roy E., to Southwire Company. Multiple layer extrusion tooling having a tip enabling extrusion of one layer onto a substrate at a point outside of the extrusion head. 4,303,734, Cl. 428-368.000.

Sumitomo Chemical Company, Ltd.: *See—*
Fuyama, Hiroshi; and Tsuji, Kozo, 4,303,640, Cl. 424-78.000.
Hirano, Masachika; Ohsumi, Tadashi; Kasamatsu, Kiyoshi; and Kato, Takashi, 4,303,672, Cl. 424-304.000.
Sasajima, Kikuo; Ono, Keiichi; Nakao, Masaru; and Yamamoto, Hisao, 4,303,663, Cl. 424-267.000.

Sumitomo Electric Industries, Ltd.: *See—*
Hara, Akio; and Yazu, Shuji, 4,303,442, Cl. 75-243.000.
Suzuki, Takashi; Akai, Shin-ichi; Mori, Hideki; Aoyagi, Katsunosuke; Shimoda, Takashi; Matsumoto, Kazuhisa; and Sasaki, Masami, 4,303,464, Cl. 156-605.000.

Sumitomo Metal Industries Limited: *See—*
Chikata, Tsukasa; Sunami, Yoshihiko; Sasaki, Keiichi; and Nishioka, Kunihiko, 4,303,498, Cl. 208-93.000.

Sumiyoshi, Tateo, to Kabushiki Kaisha Taada. Water heater. 4,303,042, Cl. 122-17.000.

Summers, William A., to Lubille Energy Development Co., Ltd. Gasification of coal. 4,303,415, Cl. 48-202.000.

Sumner, John S. Multi-edged shell structure. 4,302,914, Cl. 52-80.000.

Sumpman, Wayne C.: *See—*
Dent, Thomas H.; Sumpman, Wayne C.; and Wilhelm, John J., 4,303,368, Cl. 414-590.000.

Sunami, Yoshihiko: *See—*
Chikata, Tsukasa; Sunami, Yoshihiko; Sasaki, Keiichi; and Nishioka, Kunihiko, 4,303,498, Cl. 208-93.000.

Sunds Defibrator Aktiebolag: *See—*
Lindstrom, Alf I., 4,303,207, Cl. 241-261.200.

Sunstar Incorporated: *See—*
Adamik, Jaroslav F., 4,302,892, Cl. 36-31.000.

Suttles, James M., to Mead Corporation, The. Forward feed merchandising device for soft drink bottles. 4,303,162, Cl. 211-49.00D.

Sutton, Larry W.: *See—*
Morgan, John H.; and Sutton, Larry W., 4,303,824, Cl. 219-121.0FS.

Sutyagin, Oleg Y.: *See—*
Maslakov, Petr A.; Klushin, Nikolai A.; Juriev, Leonid A.; Kokarev, Vladimir I.; Kilin, Viktor E.; Galimov, Anas G.; Sutyagin, Oleg Y.; and Yankovsky, Oleg A., 4,303,002, Cl. 91-225.000.

Suwa Seikosha Co., Ltd.: *See—*
Saito, Toshiaki, 4,303,997, Cl. 368-259.000.

Suzuki, Fuzio: *See—*
Yoshida, Kazunori; Suzuki, Fuzio; Arakawa, Hiroshi; and Kobayashi, Takeshi, 4,303,106, Cl. 139-435.000.

Suzuki, Hitoshi: *See—*
Hakaridani, Mitsuhiro; Kamada, Hiroshi; Suzuki, Hitoshi; and Osaki, Mikio, 4,303,916, Cl. 340-712.000.

Suzuki, Isao: *See—*
Arai, Yoshio; Kataoka, Hiroyuki; Suzuki, Isao; and Yokota, Shozo, 4,303,948, Cl. 358-287.000.

Suzuki, Tadashi. Small D.C. motor. 4,303,844, Cl. 310-154.000.

Suzuki, Takashi; Akai, Shin-ichi; Mori, Hideki; Aoyagi, Katsunosuke; Shimoda, Takashi; Matsumoto, Kazuhisa; and Sasaki, Masami, to Sumitomo Electric Industries, Ltd. Method of manufacturing gallium phosphide single crystals with low defect density. 4,303,464, Cl. 156-605.000.

Suzuki, Yoji: *See—*
Ono, Syoji; Sugiyama, Takashi; Kawakami, Yoshiko; Ichikawa, Yataro; Suzuki, Yoji; Ohmori, Hitoshi; and Azuma, Akiko, 4,303,664, Cl. 424-271.000.

Suzuki, Yutaka: *See—*
Nakamura, Kiyoshi; Isaka, Masayoshi; Kurotaki, Yoshimi; and Suzuki, Yutaka, 4,303,870, Cl. 318-135.000.

Swanson, Alfred B. Plug for the intramedallary canal of a bone and method. 4,302,855, Cl. 3-1.900.

Swanson, Harold V.: *See—*
Thompson, Duncan M.; Swanson, Harold V.; and Coombs, Lawrence J., 4,303,038, Cl. 119-14.360.

Swanson, Rodney C.; and Hutchens, James O. Retractable caster wheel for a trailer. 4,303,254, Cl. 280-43.200.

Swartzbaugh, Peter T., to Owens-Illinois, Inc. Unitary container with improved lid orientation and locking means. 4,303,176, Cl. 220-306.000.

Swiatosz, Edmund, to United States of America, Navy. Fire fighting training device and method. 4,303,396, Cl. 434-226.000.

Swiatosz, Edmund, to United States of America, Navy. Smoke generating apparatus. 4,303,397, Cl. 434-226.000.

Swift & Company: *See—*
Taylor, Robert E., 4,303,683, Cl. 426-264.000.

Swindler, Henry A., to Parker-Hannifin Corporation. Hydrant valve. 4,303,093, Cl. 137-315.000.

Swingler, Donald L., to Commonwealth Scientific & Industrial Research Organization. Cold cathode ion source. 4,303,865, Cl. 250-423.00R.

Sycor, Inc.: *See—*
Basse, William J.; and Baker, James M., 4,303,346, Cl. 400-342.000.
Lada, Christopher O., 4,303,345, Cl. 400-229.000.

Sydlo Inc.: *See—*
Love, Leonard S.; and Crathern, Roger N., 4,303,517, Cl. 210-208.000.

Synek, Jan; and Tentler, Michael, to United Networks, Inc.; and Manu-Tronics, Inc. Subscriber station network. 4,303,805, Cl. 179-81.00R.

Synergy Corporation: *See—*
Marion, Frank A., 4,303,413, Cl. 44-10.00A.

Syrowatka, Rupert, to Maschinenfabrik Andritz Aktiengesellschaft. Press or reversing roller for double sieve band drainage machines. 4,302,871, Cl. 29-110.000.

Szirt nee Kiszelly, Eniko: *See—*
Berenyi nee Poldermann, Edit; Szirt nee Kiszelly, Eniko; Gorog, Peter; Petocz, Lujza; Kosoczky, Ibolya; Kovacs nee Palotai, Agnes; and Urmos nee Lassu, Gabriella, 4,303,660, Cl. 424-251.000.

T.I. Domestic Appliances, Ltd.: *See—*
Barnes, Hugh V., 4,303,384, Cl. 431-58.000.

Tada, Osamu: *See—*
Chiyomaru, Isao; Sugiyama, Hidetoshi; Niita, Koyata; Fujimori, Kunihiko; Hirano, Tadayoshi; and Tada, Osamu, 4,303,653, Cl. 424-203.000.

Takahashi, Hisayoshi; Oda, Shoichi; Satoh, Hiroshi; and Sakai, Itsuro, to Mitsubishi Jukogyo Kabushiki Kaisha; and Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Planetary-roller transmission with deformable clutching element. 4,302,988, Cl. 74-798.000.

Takahashi, Juhei: *See—*
Sawada, Daisaku; Takahashi, Juhei; and Miura, Kenzo, 4,302,964, Cl. 73-35.000.

Takahashi, Kohki; Kondoh, Takeo; Koga, Masao; and Nishiwaki, Kenichiro, to Denki Kagaku Kogyo Kabushiki Kaisha. Rubbery polymer composition. 4,303,560, Cl. 260-4.00R.

Takahashi, Toshio, to Eisai Co., Ltd. Method and apparatus for detecting foreign matters in liquids. 4,303,342, Cl. 356-427.000.

Takahashi, Yuzo; Maeda, Yoshinari; Tanaka, Yasuyuki; Nagai, Kastumi; and Oyama, Shiro, to Hokkai Can Co., Ltd. Process for forming can bodies. 4,303,032, Cl. 113-116.0QA.

Takamizawa, Minoru; Okada, Fumio; Hara, Yasuaki; and Aoki, Hisashi, to Shin-Etsu Chemical Co., Ltd. Photocurable organopolysiloxane compositions. 4,303,484, Cl. 204-159.130.

Takase, Hiroshi: *See—*
Imai, Toshihiro; and Takase, Hiroshi, 4,303,313, Cl. 350-456.000.

Takashima, Hiroshi: *See—*
Tanekawa, Tetsuo; Takashima, Hiroshi; and Hachiya, Tomoyoshi, 4,303.680, Cl. 426-60.000.

Takatori Machinery Works Ltd.: *See—*
Ueda, Toshiharu, 4,303,026, Cl. 112-121.150.

Take, Shigeo: *See—*
Aoki, Susumu; Asaumi, Hirosi; Take, Shigeo; Miyakoshi, Junichi; Takemoto, Hiroshi; and Kabayama, Kenta, 4,303,553, Cl. 252-478.000.

Takeda, Nobumi, to Shimano Industrial Company, Limited. Pedal for bicycle. 4,302,987, Cl. 74-594.600.

Takemoto, Hiroshi: *See—*
Aoki, Susumu; Asaumi, Hirosi; Take, Shigeo; Miyakoshi, Junichi; Takemoto, Hiroshi; and Kabayama, Kenta, 4,303,553, Cl. 252-478.000.

Takenoya, Hideaki; and Makabe, Hachiro, to Janome Sewing Machine Co., Ltd. Sewing machine with needle dropping hole changing control system. 4,303,028, Cl. 112-158.00E.

Takeuchi, Tomio: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Naganawa, Hiroshi; and Tatsuta, Kuniaki, 4,303,785, Cl. 536-17.00A.

Takezawa, Kenji; and Hiratani, Hajime, to Ajinomoto Co., Inc.; and Japan Chemical Research Co., Ltd. Process for production of erythropoietin. 4,303,650, Cl. 424-177.000.

Tam, Andrew C.: *See—*
Patel, Chandra K. N.; and Tam, Andrew C., 4,303,343, Cl. 356-432.000.

Tamagawa, Akira: *See—*
Kano, Tokio; and Tamagawa, Akira, 4,303,616, Cl. 422-102.000.

Tamm, Rolf: *See—*
Glaser, Horst; and Tamm, Rolf, 4,303,339, Cl. 356-244.000.

Tamura, Hideo, to Sony Corporation. Method of manufacturing magnetic powder. 4,303,699, Cl. 427-132.000.

Tanabe, Masanori: *See—*
Matsuoka, Yoshitaka; Shimazoe, Michitaka; Yamamoto, Yoshimi; Ai, Mitsuo; Miyauchi, Keiji; Nemoto, Hideyuki; Tsuchiya, Masatoshi; and Tanabe, Masanori, 4,303,903, Cl. 338-4.000.

Tanaka, Akira, to American Safety Equipment Corp. Friction clutch operated reduced tension safety retraction means. 4,303,208, Cl. 242-107.000.

Tanaka, Isamu: *See—*
Miyazawa, Osamu; Oka, Hitoshi; Tanaka, Isamu; Matsuo, Akira; Yokono, Hitoshi; Nakagawa, Nobuo; and Isogai, Tokio, 4,303,443, Cl. 106-1.230.

Tanaka, Kunihiko: *See—*
Kamiya, Takashi; Tanaka, Kunihiko; Nakai, Yoshiharu; and Sakane, Kazuo, 4,303,655, Cl. 424-246.000.

Tanaka, Toshiaki: *See—*
Etoh, Yukihiro; Tanaka, Toshiaki; Yonezawa, Haruo; and Sakamoto, Yoshikatsu, 4,303,053, Cl. 123-568.000.

Tanaka, Toshio: *See—*
Kobubu, Akio; and Tanaka, Toshio, 4,303,956, Cl. 360-123.000.

Tanaka, Yasuyuki: *See—*
Takahashi, Yuzo; Maeda, Yoshinari; Tanaka, Yasuyuki; Nagai, Kastumi; and Oyama, Shiro, 4,303,032, Cl. 113-116.0QA.

Tanaka, Yoshihiro: *See—*
Matsuda, Motonobu; and Tanaka, Yoshihiro, 4,303,335, Cl. 356-1.000.

Tanaka. Yoshiro; Okabe, Akio; and Ando, Susumu, to Lion Corporation. Method for the preparation of a lower alkyl ester of fatty acids. 4,303,590, Cl. 260-410.90R.

Tanekawa, Tetsuo; Takashima, Hiroshi; and Hachiya, Tomoyoshi, to Ajinomoto Company, Incorporated. Production of yeast extract containing flavoring. 4,303,680, Cl. 426-60.000.

Tanguy, Denis R., to Schlumberger Technology Corporation. System and method for monitoring drill string characteristics during drilling. 4,303,994, Cl. 367-35.000.

Taniguchi, Hiroshi; Yano, Osahiko; Yamamitsu, Chojuro; Kitamura, Sadafumi; and Ohtsu, Masamitsu, to Matsushita Electric Industrial Co., Ltd. Helical scan video tape recorder for recording video and audio signals on contiguous tracks. 4,303,950, Cl. 360-19.000.

Taniguchi, Hiroshi: *See—*
Yamamitsu, Chojuro; Arimura, Ichiro; and Taniguchi, Hiroshi, 4,303,952, Cl. 360-65.000.

Taniguchi, Yoshifumi, to Leith, Mitsuko. Exhaust gas control system. 4,303,143, Cl. 181-263.000.

Tanisaka, Satoshi: *See—*
Kato, Kanji; and Tanisaka, Satoshi, 4,303,979, Cl. 364-485.000.

Taplin, John F., to Vickers Limited. Locking mechanism for a storage cabinet. 4,303,287, Cl. 312-215.000.

Tarkkanen, Veikko: *See—*
Kolehmainen, Seppo E.; and Tarkkanen, Veikko, 4,303,752, Cl. 435-8.000.

Tatsuta, Kuniaki: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Naganawa, Hiroshi; and Tatsuta, Kuniaki, 4,303,785, Cl. 536-17.00A.

Tattersall, Edward G., to Vosper Hovermarine Ltd. Vehicles for operating over water. 4,303,034, Cl. 114-67.00A.

Tauzin, Francis, to Pomagalski S.A.; and Sigma Plastique. Elementary chair-lift cab for telpher railway. 4,303,016, Cl. 104-173.0ST.

Tavoni, Gian Paolo; and Baima, Mario, to Centro Ricerche Fiat S.p.A. Apparatus for detecting climatic conditions favoring the development of scab on fruit trees. 4,302,969, Cl. 73-170.00R.

Taylor, Leonard E.: *See—*
Charters, William W. S.; and Taylor, Leonard E., 4,302,942, Cl. 62-235.100.

Taylor, Robert E., to Swift & Company. Method for skinning animal tongue. 4,303,683, Cl. 426-264.000.

Tayot, Jean-Louis; and Mynard, Marie-Claude, to Institut Merieux. Cholera vaccine. 4,303,638, Cl. 424-32.000.

Tebbens, Klaas: *See—*
Guurak, Nur; and Tebbens, Klaas, 4,303,569, Cl. 260-29.7PT.

Teche, Andre: *See—*
Martel, Jacques; Tessier, Jean; Teche, Andre; and Demoute, Jean-Pierre, 4,303,585, Cl. 260-343.30R.

Technion Research & Development Foundation, Ltd.: *See—*
Zaslavsky, Dan; and Rozenberg, Lev V., 4,303,438, Cl. 71-27.000.

Technochemie GmbH-Verfahrenstechnik: *See—*
Stenzenberger, Horst, 4,303,779, Cl. 528-312.000.

Teichert, Heinrich; and Pfatteicher, Bruno, to Fabeg GmbH. Cable coupling for electrical current lines and light conductors. 4,303,301, Cl. 350-96.180.

Teijin Limited: *See—*
Minemura, Norihiro; and Kimura, Takeo, 4,303,706, Cl. 427-381.000.
Ono, Syoji; Sugiyama, Takashi; Kawakami, Yoshiko; Ichikawa, Yataro; Suzuki, Yoji; Ohmori, Hitcshi; and Azuma, Akiko, 4,303,664, Cl. 424-271.000.

Telecommunications Radioelectriques et Telephoniques T.R.T.: *See—*
Bonnerot, Georges; Senn, Patrice; and Coudreuse, Michel, 4,304,000, Cl. 370-70.000.

Teledyne Industries, Inc.: *See—*
Elkins, Christopher W.; Smith, David W.; and Trenary, John, 4,303,201, Cl. 239-383.000.

Telefonaktiebolaget L M Ericsson: *See—*
Augst, Horst G., 4,303,897, Cl. 333-189.000.
Fermvik, Leif A.; Ohlsson, Bo E.; and Skinstad, Aage E., 4,302,917, Cl. 52-221.000.

Tempelhof, Alfred, to Rollei-Werke. Circuit layout to measure exposure times and/or to control the time of exposure for a photographic camera. 4,303,317, Cl. 354-23.00D.

Tentler, Michael: *See—*
Synek, Jan; and Tentler, Michael, 4,303,805, Cl. 179-81.00R.

Terada, Ziro: *See—*
Tohda, Takao; Nitta, Tsuneharu; Fukuda, Yoji; Matsuoka, Tomizo; and Terada, Ziro, 4,303,913, Cl. 340-704.000.

Terauchi, Kiyoshi: *See—*
Hiraga, Masaharu; and Terauchi, Kiyoshi, 4,303,379, Cl. 418-55.000.

Terry, F. Duncan: *See—*
Haag, George A.; Fogg, O. Douglas; Greenley, Gordon A.; Shepard, Steve A.; and Terry, F. Duncan, 4,303,987, Cl. 364-900.000.

Terumo Corporation: *See—*
Ichikawa, Toshiji; and Watanabe, Teruko, 4,303,070, Cl. 128-218.00P.

Tessier, Jean: *See—*
Martel, Jacques; Tessier, Jean; Teche, Andre; and Demoute, Jean-Pierre, 4,303,585, Cl. 260-343.30R.

Teutsch, Jean G.: *See—*
Deraedt, Roger; Teutsch, Jean G.; and Costerousse, Germain, 4,303,654, Cl. 424-243.000.

Tex-Fab, Inc.: *See—*
Wiley, Thomas W.; and Joyce, William R., 4,303,189, Cl. 226-15.000.

Texaco Inc.: *See—*
Chou, Kechia J., 4,303,535, Cl. 252-51.50A.

Thackaberry, S. Paul: *See—*
Chow, Wai Y.; and Thackaberry, S. Paul, 4,303,775, Cl. 528-170.000.

Thakur, Pramod C., to Conoco Inc. Degasification of coal seams. 4,303,274, Cl. 299-12.000.

Thalmann, Claude, to Polytronic AG. Method of and apparatus for determining the impact site of a bullet upon a target. 4,303,853, Cl. 235-400.000.

Theissen, Ferdinand: *See—*
Lussling, Theodor; Muller, Klaus-Peter; Schreyer, Gerd; and Theissen, Ferdinand, 4,303,621, Cl. 423-189.000.

Theorell, Mats. Filter device. 4,303,514, Cl. 210-136.000.

Thermo King Corp.: *See—*
Mayer, Donald K., 4,303,090, Cl. 137-114.000.

Thibault, Ronald M., to Osborne Industries, Inc. Animal feeder with fluted joint. 4,303,039, Cl. 119-52.00R.

Thiele, Karl-Heinz, to Licentia Patent-Verwaltungs-G.m.b.H. Dynamic electroacoustic transducer having a moving coil in an air gap filled with a magnetic liquid. 4,303,806, Cl. 179-115.5VC.

Thir, Basil: *See—*
Newkirk, David D.; Login, Robert B.; and Thir, Basil, 4,303,767, Cl. 525-444.000.

Tholen, James W. End plug assembly for sewer pipe. 4,303,101, Cl. 138-89.000.

Thomas, John C. Vehicle multispeed drive system utilizing arm and leg power. 4,303,255, Cl. 280-234.000.

Thomas, Luz E.: *See—*
Sergeant, Timothy L.; and Thomas, Luz E., 4,303,724, Cl. 428-229.000.

Thomas, Michael D.; and Ryder, Francis E., to Ryder International Corporation. Disinfector unit with swing-out tray. 4,303,828, Cl. 219-521.000.

Thompson, David K.; and Crisp, David, to Rizla Limited. Manually operated cigarette making machine. 4,303,082, Cl. 131-75.000.

Thompson, Duncan M.; Swanson, Harold V.; and Coombs, Lawrence J., to Babson Bros. Co. Teat cup with air inlet. 4,303,038, Cl. 119-14.360.

Thompson, Kenneth E.: *See—*
Guernndt, H. Fred, Jr.; and Thompson, Kenneth E., 4,302,922, Cl. 56-235.000.

Thompson, Robert L., to Xerox Corporation. Magnet for use in a magnetic brush development system. 4,303,331, Cl. 355-3.0DD.

Thompson, Warren L.: *See—*
Gage, Douglas M.; and Thompson, Warren L., 4,303,089, Cl. 137-113.000.

Thompson, William P.; and Stelle, James M. Supportive body harness. 4,303,041, Cl. 119-96.000.

Thoms, Roland, to Buckbee-Mears Company. Process of forming graded aperture masks. 4,303,466, Cl. 156-626.000.

Thomsen, Adolf, to Metallgesellschaft Aktiengesellschaft. Method of recovering elemental sulfur from reactive gases containing sulfur dioxide and hydrogen sulfide. 4,303,633, Cl. 423-574.00R.

Thomsen Equipment Company: *See—*
Hunter, John, 4,303,378, Cl. 417-517.000.

Thomson CSF: *See—*
Berger, Jean L.; and Coutures, Jean L., 4,303,839, Cl. 307-304.000.
Claverie, Claude, 4,303,888, Cl. 329-103.000.
Pressiat, Robert; de Corlieu, Guy; Malard, Marcel; and d'Auria, Luigi, 4,303,300, Cl. 350-96.200.
Tourneur, Jacky, 4,303,900, Cl. 333-239.000.

Thunberg, John Y. L.: *See—*
Lindahl, Ulf P. F.; Backstrom, Gudrun E.; Thunberg, John Y. L.; Fransson, Lars-Ake; Andersson, Lars-Olov; Holmer, Erik Y.; Sandberg, Inga H.; and Soderstrom, Ewa G., 4,303,651, Cl. 424-183.000.

Ticker, Arthur; Preiser, Herman S.; Klemens, William; and Drake, John L., Jr. Apparatus and method for molding of submerged surfaces. 4,303,608, Cl. 264-40.100.

TII Industries, Inc.: *See—*
Roberts, Charles A.; and Jones, Raymond D., 4,303,959, Cl. 361-124.000.

Tilgner, Hans G.: *See—*
Bulle, Wolfgang; and Tilgner, Hans G., 4,303,733, Cl. 428-367.000.

Timossi, Giovanni: *See—*
Dellepiane, Enrico; Ricci, Roberto; and Timossi, Giovanni, 4,303,182, Cl. 222-600.000.

TMC Corporation: *See—*
Poellmann, Edgar, 4,303,260, Cl. 280-625.000.

Tobias, Michael A., to Mobil Oil Corporation. Composition comprising ester of epoxy, unsaturated fatty acid dimer or trimer and acid containing addition polymer, and aqueous coating compositions prepared therefrom. 4,303,565, Cl. 260-23.0CP.

Tobitsuka, Junzo: *See—*
Oyamada, Kozo; Matsui, Takashi; Tobitsuka, Junzo; Yamazaki, Yoshio; and Ogawa, Masami, 4,303,440, Cl. 71-89.000.

Tohda, Takao; Nitta, Tsuneharu; Fukuda, Yoji; Matsuoka, Tomizo; and Terada, Ziro, to Matsushita Electric Industrial Co., Ltd. Fluorescent display device and display apparatus using the same. 4,303,913, Cl. 340-704.000.

Tokico, Ltd.: *See—*
Uemura, Tamio; Ito, Yoshimasa; and Itakura, Takahiro, 4,303,027, Cl. 112-121.260.

Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
Kakizawa, Toshio; and Sakai, Itsuo, 4,304,003, Cl. 371-62.000.
Morita, Hiroshi; and Washida, Hiroshi, 4,303,310, Cl. 350-357.000.
Ohnishi, Shunichi; Obara, Masaharu; Sakurai, Masaru; and Yamada, Hisashi, 4,303,895, Cl. 333-18.000.
Tsunekawa, Shinichi; and Hojo, Makoto, 4,303,290, Cl. 316-20.000.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Satou, Kazuo; and Ueno, Mitsuhiko, 4,302,875, Cl. 29-571.000.

Tolksdorf, Reinhold, to Hafele KG. Apparatus for holding panels for fastening to a carrier framework. 4,302,989, Cl. 81-5.10R.

Toombs, Gary C.: *See—*
Gallusser, David O.; Hemmer, Valentine J.; Toombs, Gary C.; and Brush, Robert W., 4,303,221, Cl. 249-102.000.

Tophinke, Franz: *See—*
Claas, Helmut; and Tophinke, Franz, 4,303,079, Cl. 130-272.000.

Toray Industries, Inc.: *See—*
Edagawa, Hiroshi; Fujita, Toshinori; and Uesugi, Yasuo, 4,302,925, Cl. 57-58.950.

Torgersen, Daniel L.; and Fischer, Leon H., to Buckbee-Mears Company. Method of marking plastic lenses. 4,303,701, Cl. 427-145.000.

Torobin, Leonard. Hollow plastic microspheres. 4,303,736, Cl. 428-403.000.

Torobin, Leonard B. Solar energy collector having hollow microspheres. 4,303,061, Cl. 126-450.000.

Torobin, Leonard B. Method and apparatus for producing hollow microspheres. 4,303,431, Cl. 65-21.400.

Torobin, Leonard B. Method for compressing gaseous materials in a contained volume. 4,303,432, Cl. 65-21.400.

Torobin, Leonard B. Centrifuge apparatus and method for producing hollow microspheres. 4,303,433, Cl. 65-21.400.

Torobin, Leonard B. Method and apparatus for producing hollow plastic microspheres. 4,303,603, Cl. 264-69.000.

Torobin, Leonard B. Hollow plastic microspheres. 4,303,729, Cl. 428-327.000.

Torobin, Leonard B. Hollow microspheres. 4,303,730, Cl. 428-333.000.

Torobin, Leonard B. Compressed gaseous materials in a contained volume. 4,303,731, Cl. 428-333.000.

Torobin, Leonard B. Hollow microspheres. 4,303,732, Cl. 428-333.000.

Toshiba Corporation: *See—*
Kimura, Sakae; Shimura, Masahiro; Enokida, Kenji; and Nihei, Hideharu, 4,303,846, Cl. 313-178.000.
Shimizu, Kenichi; Kamiya, Akihiro; Yamazaki, Shu; Akiyama, Riozo; Makuuchi, Teruji; and Yoshizaki, Shiichiro, 4,303,848, Cl. 313-346.00R.

Toshiba Silicone Co., Ltd.: *See—*
Hatanaka, Masayuki; and Kurita, Atsushi, 4,303,572, Cl. 260-37.0SB.

Toth, Klara: *See—*
Petro, Jozsef; Pungor, Erno; Toth, Klara; and Rakias, Ferenc, 4,303,740, Cl. 428-548.000.

Totten, Howard Q.: *See—*
Kinsey, Richard R.; Halbritter, George W.; Binsley, David L.; Rasmussen, Allan E.; and Totten, Howard Q., 4,303,898, Cl. 333-114.000.

Tourneur, Jacky, to Thomson-CSF. Wide band waveguide with double polarization and ultra-high frequency circuit incorporating such a waveguide. 4,303,900, Cl. 333-239.000.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Katayama, Nobuaki, 4,302,984, Cl. 74-375.000.
Kobashi, Mamoru; and Ogawa, Toshihisa, 4,303,977, Cl. 364-431.000.
Masutani, Takayoshi, 4,303,878, Cl. 322-99.000.
Nakanishi, Kiyoshi; and Motosugi, Katsuhiko, 4,303,046, Cl. 123-308.000.

Sawada, Daisaku; Takahashi, Juhei; and Miura, Kenzo, 4,302,964, Cl. 73-35.000.
Sugiyama, Matsuyoshi; and Okano, Hiroshi, 4,302,975, Cl. 73-460.000.

Traenckner, Hans-Joachim: *See—*
Frank, Walter; Bendszus, Otto; Freier, Hansjoachim; and Traenckner, Hans-Joachim, 4,303,567, Cl. 260-29.2UA.

Travel-Drink, Inc.: *See—*
Cohen, Donald P., 4,303,109, Cl. 141-98.000.

Trebel, John M.: *See—*
Chrichton, John P.; Trebel, John M.; Cuff, George W.; Goodwin, David H.; and Levy, Edward D., 4,302,990, Cl. 81-60.000.

Trenary, John: *See—*
Elkins, Christopher W.; Smith, David W.; and Trenary, John, 4,303,201, Cl. 239-383.000.

Trimboli Longhetto, Antonio A., to Oswald, Victor M. Refrigeration and heating system. 4,302,949, Cl. 62-402.000.

Trost, Sergio, to Centro Ricerche Fiat S.p.A. Process for the reutilization of paint sludges. 4,303,559, Cl. 260-2.300.

Trungold, Emanuel H. Bolt tension indicating means. 4,303,001, Cl. 411-10.000.

Tsao, Sherman H., to International Business Machines Corporation. Apparatus for exciting an array of ink jet nozzles and method of forming. 4,303,927, Cl. 346-75.000.

Tsay, Wei-Shin: *See—*
Ham, David O.; and Tsay, Wei-Shin, 4,303,483, Cl. 204-157.10R.

Tschacher, Hans-Dieter, to Festo-Maschinenfabrik Gottlieb Stoll. Pneumatically operated grinding apparatus. 4,302,910, Cl. 51-170.0MT.

Tschunt, Edgar: *See—*
Heinzelmann, Karl G.; Schmitt, Guenter; and Tschunt, Edgar, 4,303,830, Cl. 250-445.00T.

Tsuboka, Eiichi; Maehara, Fumio; Fujita, Hiroshi; Izura, Yoshiteru, deceased; and by Izura, Keiko, heir. Random accessible signal filing system. 4,303,988, Cl. 364-900.000.

Tsuchiya, Masatoshi: *See—*
Matsuoka, Yoshitaka; Shimazoe, Michitaka; Yamamoto, Yoshimi; Ai, Mitsuo; Miyauchi, Keiji; Nemoto, Hideyuki; Tsuchiya, Masatoshi; and Tanabe, Masanori, 4,303,903, Cl. 338-4.000.

Tsuetaki, George F.: *See—*
Novicky, Nick N., 4,303,772, Cl. 526-279.000.

Tsuji, Kozo: *See—*
Fuyama, Hiroshi; and Tsuji, Kozo, 4,303,640, Cl. 424-78.000.

Tsunekawa, Shinichi; and Hojo, Makoto, to Tokyo Shibaura Denki Kabushiki Kaisha. Method of evacuating a fluorescent lamp bulb. 4,303,290, Cl. 316-20.000.

Tung, Chiang-Ying M.: *See—*
Hamermesh, Charles L.; Tung, Chiang-Ying M.; and Hogenson, Peter A., 4,303,727, Cl. 428-314.000.

Tureck, Al; and Gordon, Theodore P. Copy security system. 4,303,307, Cl. 350-276.00R.

Turner, John H. W., to Manchem Limited. Methods and compositions for preservation of timber. 4,303,726, Cl. 427-297.000.

Tutsek, Alexander: *See—*
Bartha, Peter; and Tutsek, Alexander, 4,303,449, Cl. 501-128.000.

Twaddell, Victor A.: *See—*
Wood, John H.; and Twaddell, Victor A., 4,303,480, Cl. 204-15.000.

Tyler Refrigeration Corporation: *See—*
Ibraham, Fayez F.; Subera, Elmer; and deBruyn, William, 4,302,948, Cl. 62-256.000.
Ibrahim, Fayez F., 4,302,946, Cl. 62-82.000.

Tzou, Albert J.: *See—*
Barkley, Keith G.; Ghafghaichi, Majid; Gopalakrishna, Yelandur R.; and Tzou, Albert J., 4,303,992, Cl. 365-51.000.

Uchiyama, Hisaya: *See—*
Kuwabara, Takao; Uchiyama, Hisaya; and Okumura, Hiroshi, 4,303,370, Cl. 415-17.000.

Ueda, Akiyoshi; Kojima, Shigeru; Yasuda, Yasushi; Nishikawa, Hiroaki; and Nakada, Akira, to Nippon Soda Company Limited. Phenylprrole derivatives. 4,303,667, Cl. 424-274.000.

Ueda, Toshiharu, to Takatori Machinery Works Ltd. Seaming method and apparatus for gored panty-hose. 4,303,026, Cl. 112-121.150.

Uehara, Takeo, to Yoshida Kogyo K.K. Window latch. 4,303,264, Cl. 292-7.000.

Uemura, Tamio; Ito, Yoshimasa; and Itakura, Takahiro, to Tokico, Ltd. Cloth feeding apparatus. 4,303,027, Cl. 112-121.260.

Ueno, Mitsuhiko: *See—*
Satou, Kazuo; and Ueno, Mitsuhiko, 4,302,875, Cl. 29-571.000.

Ueshima, Kenro: *See—*
Fukui, Jun; Niwa, Senji; Kawashima, Norihiro; Ueshima, Kenro; and Shimizu, Katumi, 4,303,618, Cl. 422-190.000.

Uesugi, Yasuo: *See—*
Edagawa, Hiroshi; Fujita, Toshinori; and Uesugi, Yasuo, 4,302,925, Cl. 57-58.950.

Uhler, Roger O.: *See—*
Beske, Grant A.; Cohen, Abraham B.; and Uhler, Roger O., 4,303,698, Cl. 427-96.000.

Umezawa, Hamao; Takeuchi, Tomio; Naganawa, Hiroshi; and Tatsuta, Kuniaki, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Antitumor anthracycline antibiotics. 4,303,785, Cl. 536-17.00A.

Unger, John M.: *See—*
Grimm, Daniel J.; Unger, John M.; and Virag, Robert A., 4,303,601, Cl. 261-142.000.

Union Carbide Corporation: *See—*
D'Silva, Themistocles D. J., 4,303,669, Cl. 424-282.000.
Durden, John A., Jr.; and Kurtz, Arthur P., Jr., 4,303,788, Cl. 544-164.000.
Kelly, William T., III; and Stahl, Francis, 4,303,876, Cl. 320-2.000.
Lewis, Richard T.; and Lewis, Irwin C., 4,303,631, Cl. 423-447.100.
Wagner, Burkhard E.; Goeke, George L.; and Karol, Frederick J., 4,303,771, Cl. 526-125.000.

United Kingdom Atomic Energy Authority: *See—*
Collins, Gerald, 4,303,504, Cl. 209-223.00R.

United Networks, Inc.: *See—*
Synek, Jan; and Tentler, Michael, 4,303,805, Cl. 179-81.00R.

United States of America
Army: *See—*
Barley, Thomas A.; Rast, Gustaf J., Jr.; and Ashley, James R., 4,303,899, Cl. 333-225.000.
Camplin, Harry R.; and Shackleton, Michael A., 4,303,423, Cl. 55-337.000.
Gilman, Sol, 4,303,604, Cl. 264-101.000.
Energy: *See—*
Amtmann, Hans H., 4,303,177, Cl. 220-323.000.
Crewe, Albert V.; and Kopf, David A., 4,303,864, Cl. 250-396.00R.
Golestaneh, Ahmad A., 4,302,939, Cl. 60-527.000.
Niemann, Ralph C.; Zelipsky, Steven A.; Rezmer, Ronald R.; and Smelser, Peter, 4,302,943, Cl. 62-49.000.
Interior: *See—*
Huckins, James N.; Stalling, David L.; Petty, Jimmie D.; and Smith, Lawrence M., 4,303,529, Cl. 210-635.000.
Roepke, Wallace W.; and Anderson, Sterling J., 4,303,277, Cl. 299-43.000.
Smelley, Annie G.; Montgomery, Robert W.; and Hamner, Bobby J., 4,303,532, Cl. 210-732.000.
National Aeronautics and Space Administration; administrator; with respect to an invention of:
Wydeven, Theodore; Wood, Peter C.; Ballou, Edward V.; and Spitze, Leroy A. Use of glow discharge in fluidized beds. 4,303,961, Cl. 361-230.000.
Navy: *See—*
Berke, Herbert; Allen, John H.; and Owen, Joseph R., 4,303,394, Cl. 434-40.000.
Berke, Herbert; Allen, John H.; and Owen, Joseph R., 4,303,868, Cl. 315-364.000.
Berke, Herbert; and Allen, John H., 4,303,938, Cl. 358-139.000.
Burns, Robert H., 4,303,035, Cl. 114-187.000.
Copeland, Hugh D., 4,303,410, Cl. 23-230.00R.
Fitzgerald, David L.; and Olsen, Robert C., 4,303,921, Cl. 343-18.00E.
Hoisington, David B., 4,303,922, Cl. 343-114.000.
Stone, W. James; and Stoutmeyer, Ronald G., 4,303,212, Cl. 244-122.0AD.
Swiatosz, Edmund, 4,303,396, Cl. 434-226.000.
Swiatosz, Edmund, 4,303,397, Cl. 434-226.000.

U.S. Philips Corporation: *See—*
Boonstra, Alexander H.; and Mutsaers, Cornelis A. H. A., 4,303,742, Cl. 428-697.000.
Gaffre, Michel, 4,303,931, Cl. 357-17.000.
Pech, Eckart, 4,303,890, Cl. 330-257.000.
Sanderson, Hendrik J., 4,303,953, Cl. 360-78.000.
van der Meulen, Andries, 4,303,867, Cl. 315-360.000.
Van Gorkom, Gerardus G. P.; and Hoeberechts, Arthur M. E., 4,303,930, Cl. 357-13.000.
Wagner, Wolfgang, 4,303,829, Cl. 250-445.00T.

U.S. Steel Corporation: *See—*
Kengle, Fritz; and Young, James E., 4,303,194, Cl. 236-15.00E.

United States Surgical Corporation: *See—*
Hill, Jeremy R.; and Meyer, Allen E., 4,303,887, Cl. 324-441.000.

United Technologies Corporation: *See—*
DuBell, Thomas L., 4,302,941, Cl. 60-757.000.
Snitzer, Elias; and Glenn, William H., 4,302,970, Cl. 73-339.00R.
Wynosky, Thomas A.; Eiler, Donald C.; and Blatt, Jerrold R., 4,302,934, Cl. 60-262.000.

Universal Developer Corporation: *See—*
Michlin, Norman, 4,303,329, Cl. 354-300.000.

University of Illinois Foundation: *See—*
Buchanan, Relva C.; DeFord, H. Dale; and Sircar, Anup, 4,303,447, Cl. 501-103.000.

University of Iowa Research Foundation: *See—*
Frank, Clyde W.; Nord, Paul J.; and Cox, Robert D., 4,303,419, Cl. 55-185.000.

University of Melbourne, The: *See—*
Charters, William W. S.; and Taylor, Leonard E., 4,302,942, Cl. 62-235.100.

University of Rochester, The: *See—*
Ham, David O.; and Tsay, Wei-Shin, 4,303,483, Cl. 204-157.10R.

UOP Inc.: *See—*
Gatsis, John G., 4,303,634, Cl. 423-561.00R.

Upjohn Company, The: *See—*
Fitzpatrick, Francis A., 4,303,671, Cl. 424-285.000.
Nelson, Norman A., 4,303,796, Cl. 560-60.000.

Uppvall, Charles P. Method for detecting golfer's head movement when putting. 4,303,244, Cl. 273-183.00B.

Upton, Albert E. Method of manufacturing articles. 4,303,349, Cl. 404-6.000.

Urban, Keith F., to International Jensen Incorporated. Combined acoustical transducer and grille. 4,303,142, Cl. 181-144.000.

Urmos nee Lassu, Gabriella: *See*—
Berenyi nee Poldermann, Edit; Szirt nee Kiszelly, Eniko; Gorog, Peter; Petocz, Lujza; Kosoczky, Ibolya; Kovacs nee Palotai, Agnes; and Urmos nee Lassu, Gabriella, 4,303,660, Cl. 424-251.000.

Usardi, Maria M.: *See*—
Gandolfi, Carmelo; Passarotti, Carlo; Andreoni, Alessandro; Fumagalli, Angelo; Faustini, Franco; Ceserani, Roberto; and Usardi, Maria M., 4,303,670, Cl. 424-285.000.

Vac-Tec Systems, Inc.: *See*—
Morrison, Charles F., Jr., 4,303,489, Cl. 204-192.00R.

Vahlbrauk, Karl H. Heat exchange structural element. 4,303,125, Cl. 165-168.000.

Vallero, Sergio: *See*—
Ansaldi, Renato; and Vallero, Sergio, 4,303,837, Cl. 307-262.000.

Van Doorne's Transmissie B.V.: *See*—
Lamers, Hendricus F., 4,303,403, Cl. 474-201.000.

Vandenbussche, Gerard, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Cryogenic processes for separating air. 4,303,428, Cl. 62-13.000.

van den Elshout, Johannes; and Asselbergs, Jan, to IHC Holland N.V. Digging wheel for a suction dredger vessel. 4,302,893, Cl. 37-66.000.

van der Meulen, Andries, to U.S. Philips Corporation. Domestic appliance comprising a protected programming device. 4,303,867, Cl. 315-360.000.

Van Gorkom, Gerardus G. P.; and Hoeberechts, Arthur M. E., to U.S. Philips Corporation. Semiconductor device for generating an electron beam and method of manufacturing same. 4,303,930, Cl. 357-13.000.

Vanlerberghe, Guy; and Sebag, Henri, to Societe Anonyme dite: l'Oreal. 1,2-Alkanediol derivatives in cosmetic compositions as an excipient therefor. 4,303,639, Cl. 424-63.000.

Van Loveren, Augustinus G.: *See*—
Boden, Richard M.; Dekker, Lambert; Schmitt, Frederick L.; and Van Loveren, Augustinus G., 4,303,555, Cl. 252-522.00R.

Vapor Corporation: *See*—
Reip, Raymond G., 4,303,003, Cl. 91-453.000.

Vaportek, Inc.: *See*—
Bryson, John D., 4,303,617, Cl. 422-123.000.

Varen Technology: *See*—
Vaughan, Ronald J., 4,303,551, Cl. 252-430.000.

Varian Associates, Inc.: *See*—
Harra, David J.; and Nystrom, William C., 4,303,251, Cl. 277-236.000.

Vars, Charles A., to InterVet, Inc. Therapeutic magnet. 4,303,062, Cl. 128-1.300.

Vaseen, Vesper A. Growing cells of plants in a multi-media hydroponic environment. 4,302,905, Cl. 47-58.000.

Vassiliades, Anthony E. Chromogenic copy system. 4,303,719, Cl. 428-207.000.

Vaughan, Ronald J., to Varen Technology. Supported catalyst. 4,303,551, Cl. 252-430.000.

Vazquez, Roberto. Ladder, platform & extension. 4,303,145, Cl. 182-122.000.

VEB Kombinat Textima: *See*—
Wolfgang, Rose, 4,302,952, Cl. 66-75.200.

Velinsky, Frantisek: *See*—
Maixner, Vaclav; Miklas, Zdenek; Velinsky, Frantisek; Rypka, Cestmir; Vorisek, Premysl; Rohlena, Vaclav; and Divis, Vaclav, 4,302,926, Cl. 57-58.950.

Velten & Pulver, Inc.: *See*—
Euverard, Maynard R.; Heide, Henry A.; and Diver, James J., 4,303,365, Cl. 414-37.000.

Venmark Corporation: *See*—
Cumpston, Edward H., 4,303,802, Cl. 179-2.00A.

Vettiger, Peter: *See*—
Bapst, Urs H.; Gfeller, Fritz; and Vettiger, Peter, 4,303,855, Cl. 250-226.000.

Vickers Limited: *See*—
Taplin, John F., 4,303,287, Cl. 312-215.000.

Victor Hasselblad Aktiebolag: *See*—
Persson, Kjell-Anders; and Stalfors, Lennart, 4,303,328, Cl. 354-288.000.

Vij, Hem R.: *See*—
Schwartz, Robert B.; Miller, Frank J.; and Vij, Hem R., 4,302,913, Cl. 52-39.000.

Vilcinskas, Charles K. Adjustable anchored bulkhead system. 4,303,355, Cl. 405-262.000.

Vile, Robert L.; and Pitkjaan, Elam, to Westinghouse Electric Corp. Single-mode vehicular headlamp system. 4,303,965, Cl. 362-61.000.

Villa, Giuseppe: *See*—
Ferrari, Giovanni; and Villa, Giuseppe, 4,303,491, Cl. 204-279.000.

Vinals, Joaquin F.: *See*—
Sprecker, Mark A.; Schmitt, Frederick L.; Vock, Manfred H.; Vinals, Joaquin F.; and Kiwala, Jacob, 4,303,725, Cl. 428-291.000.

Vincent, Gary A.: *See*—
Kalinowski, Robert E.; and Vincent, Gary A., 4,303,566, Cl. 260-29.1SB.

Virag, Robert A.: *See*—
Grimm, Daniel J.; Unger, John M.; and Virag, Robert A., 4,303,601, Cl. 261-142.000.

Vitel, Jean-Pierre: *See*—
Pierrel, Michel; and Vitel, Jean-Pierre, 4,303,262, Cl. 285-232.000.

Vivitar Corporation: *See*—
Kreitzer, Melvyn H., 4,303,315, Cl. 350-461.000.

Vock, Manfred H.: *See*—
Sprecker, Mark A.; Schmitt, Frederick L.; Vock, Manfred H.; Vinals, Joaquin F.; and Kiwala, Jacob, 4,303,725, Cl. 428-291.000.

Voest-Alpine Aktiengesellschaft: *See*—
Ruppnig, Herbert, 4,303,523, Cl. 210-386.000.

Voith Getriebe KG: *See*—
Schmolz, Hubert, 4,302,983, Cl. 74-104.000.

Volpe, Giancarlo: *See*—
Cavalleri, Bruno; Pagani, Hermes; and Volpe, Giancarlo, 4,303,646, Cl. 424-118.000.

Volpi, Harry. Entry impedient device. 4,303,266, Cl. 292-166.000.

von der Neyen, Hans J., to Siemens Aktiengesellschaft. Apparatus for transmission and reception of frequency modulated digital communication signals. 4,304,004, Cl. 375-88.000.

Voorheis, Temple S.; Vosper, Ralph R.; Binasik, Chester S.; and Harthun, Norman, to Coen Company, Inc. Parallel flow burner. 4,303,386, Cl. 431-177.000.

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Maixner, Vaclav; Miklas, Zdenek; Velinsky, Frantisek; Rypka, Cestmir; Vorisek, Premysl; Rohlena, Vaclav; and Divis, Vaclav, 4,302,926, Cl. 57-58.950.

Vosper Hovermarine Ltd.: *See*—
Tattersall, Edward G., 4,303,034, Cl. 114-67.00A.

Vosper, Ralph R.: *See*—
Voorheis, Temple S.; Vosper, Ralph R.; Binasik, Chester S.; and Harthun, Norman, 4,303,386, Cl. 431-177.000.

Vostovich, Joseph E., to General Electric Company. Heat resistant ethylene-propylene rubber with improved tensile properties and insulated conductor product thereof. 4,303,574, Cl. 260-42.150.

Vucich, David J. Adjustable inclined calculator stand. 4,303,156, Cl. 206-305.000.

Vysoka skola chemicko-technologicka: *See*—
Kralicek, Jaroslav; Kubanek, Vladimir; Marik, Jiri; Kondelikova, Jaroslava; Machacek, Jiri; and Casensky, Bohuslav, 4,303,778, Cl. 528-312.000.

Vyzkumny ustav bavlnarsky: *See*—
Maixner, Vaclav; Miklas, Zdenek; Velinsky, Frantisek; Rypka, Cestmir; Vorisek, Premysl; Rohlena, Vaclav; and Divis, Vaclav, 4,302,926, Cl. 57-58.950.

W. C. Heraeus GmbH: *See*—
Aldinger, Fritz; and Werdecker, Waltraud, 4,303,635, Cl. 423-561.00B.

W. H. Brady Co.: *See*—
Parkinson, Wayne K., 4,303,811, Cl. 200-5.00A.

W. R. Case & Sons Cutlery Company: *See*—
Hart, Thomas D.; and Hart, David J., 4,302,877, Cl. 30-161.000.

W. R. Grace & Co.: *See*—
DeWolf, Robert B., II; and Glemza, Rimantas, 4,303,641, Cl. 424-49.000.
Ernest, Michael V.; and Welsh, William A., 4,303,552, Cl. 252-465.000.
Rodriguez, Jorge M., 4,303,721, Cl. 428-213.000.

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Leclerc, Jean-Francois; Paret, Jacques; and Waegaert, Pierre, 4,303,081, Cl. 131-282.000.

Waegerle, Rolf R., to Benckiser-Knapsack GmbH. Process of treating aqueous heating media in heating systems, and composition. 4,303,546, Cl. 252-180.000.

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Wagner, Richard C., to Hollymatic Corporation. Molding apparatus. 4,302,868, Cl. 17-32.000.

Wagner, Wolfgang, to U.S. Philips Corporation. Method of and device for determining body contours for the measurement of the absorption distribution in a slice of the body. 4,303,829, Cl. 250-445.00T.

Walden, John G.: *See*—
Munt, Irwin; Emile, Philip, Jr.; and Walden, John G., 4,303,880, Cl. 324-99.00D.

Walker, Brian; and Merrie, Kenneth, to Process Scientific Innovations Limited. Filter elements for gas or liquid and methods of making such filters. 4,303,472, Cl. 162-221.000.

Walker & Mart Solar Laboratories, Inc.: *See*—
Mart, Kenneth D., 4,303,060, Cl. 126-445.000.

Walker-Neer Manufacturing Co., Inc.: *See*—
Adair, Harold L., 4,303,270, Cl. 294-88.000.

Wallac Oy: *See*—
Ostrup, Jan, 4,303,858, Cl. 250-328.000.

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Shepherd, Michael, 4,302,986, Cl. 74-574.000.

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Emmett, James S., 4,302,876, Cl. 30-47.000.

Warnez, Michel Y., to M&T Chemicals Inc. Method for inhibiting benzene formation in antifouling paints. 4,303,444, Cl. 106-16.000.

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Guitteny, Jean L.; Plaze, Jean P.; Roux, Michel; and Warren, Gregory N., 4,303,682, Cl. 426-250.000.

Wase, Keizou: *See*—
Nagao, Masato; Ito, Yoshiyasu; Wase, Keizou; Kazawa, Yoshiaki; and Fujinaga, Takamasa, 4,303,473, Cl. 376-150.000.

Wasel-Nielen, Joachim; Merkenich, Karl; Gehrig, Oskar, deceased (by Buettner, Ralf, heir); and Sommer, Klaus, to Benckiser-Knapsack

GmbH Ladenburg. Process for charging a latent heat storage device with a salt hydrate composition. 4,303,541, Cl. 252-70.000.

Washida, Hiroshi: *See*—
Morita, Hiroshi; and Washida, Hiroshi, 4,303,310, Cl. 350-357.000.

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Ichikawa, Toshiji; and Watanabe, Teruko, 4,303,070, Cl. 128-218.00P.

Wayman, William G., to Crosfield Electronics Limited. Longitudinal drive mechanisms. 4,302,981, Cl. 74-89.150.

Weakley, Burton, to Plustronix (Proprietary) Limited. Vehicle acceleration monitoring device. 4,303,906, Cl. 340-52.00R.

Webb, Gerald J.: *See*—
Hice, Jaxon O.; and Webb, Gerald J., 4,303,008, Cl. 99-353.000.

Weber, Marcel, to Societe Samibem, S.A. Mower with bottom-driven cutter discs. 4,302,921, Cl. 56-13.600.

Weber, Robert N.: *See*—
Hamsher, Wilbur A., Jr.; and Weber, Robert N., 4,303,294, Cl. 339-74.00R.

Weber, William J., to Joy Manufacturing Company. Safety device for rotary earth drilling apparatus. 4,303,132, Cl. 173-147.000.

Wegehaupt, Dieter: *See*—
Schmuck, Gunter; and Wegehaupt, Dieter, 4,303,456, Cl. 156-78.000.

Weindanz, Herbert; and Auf dem Graben, Horst, to N.V. Optische Industrie "De Oude Delft". Package for single film stack. 4,303,160, Cl. 206-455.000.

Weisert, Edward D.; and Agrawal, Suphal P., to Rockwell International Corporation. Composition for fabricating superplastically formed/diffusion bonded structures. 4,303,570, Cl. 260-31.20R.

Weishaar, Rainer E., to Michigan Motor Corporation. Fuel economizer. 4,303,051, Cl. 123-557.000.

Weiss, Aby: *See*—
Franke, Rudiger; Fauerbach, Rudolf; Wenzel, Michael; and Weiss, Aby, 4,303,140, Cl. 180-6.200.

Weisser, Fritz, to Dual Gebruder Steidinger GmbH & Co. Control device for a tape recorder. 4,303,954, Cl. 360-90.000.

Weissman, Bernard, to IPCO Corporation. Dental bore-locating guide. 4,303,391, Cl. 433-76.000.

Weller, Carroll E.; and Woodruff, Thomas J., to Cincinnati Electronics Corporation. Unconditionally stabilized microwave transistor amplifier. 4,303,892, Cl. 330-286.000.

Welsh, William A.: *See*—
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Biedermann, Jurgen; Wendel, Armin; Betzing, Hans; and Neuser, Volker, 4,303,673, Cl. 424-324.000.

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Hidalgo, Jaime; Wenner, Valentin; and Forni, Francoise, 4,303,580, Cl. 260-113.000.

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West, Lawrence C. Continuous high speed modulation of light with light. 4,303,309, Cl. 350-354.000.

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Pertl, Don L., 4,302,895, Cl. 38-15.000.

Western Electric Company, Incorporated: *See*—
Chang, Joseph J., 4,303,715, Cl. 428-137.000.
Dines, David R., 4,303,291, Cl. 339-17.00B.

Westinghouse Electric Corp.: *See*—
Dent, Thomas H.; Sumpman, Wayne C.; and Wilhelm, John J., 4,303,368, Cl. 414-590.000.
Fawcett, James M.; and Parrish, William F., 4,303,945, Cl. 358-222.000.
Gainer, Gordon C., 4,302,944, Cl. 62-59.000.
Lesster, Laban E.; and Opdahl, Everett W., 4,303,902, Cl. 336-83.000.
Malick, Franklin S., 4,303,884, Cl. 324-220.000.
Nathenson, Richard D., 4,303,842, Cl. 310-64.000.
Redding, Arnold H., 4,303,043, Cl. 122-382.000.
Stacey, Eric J.; Baker, Donal E.; Doughman, Charles L.; and Jessee, Ralph D., 4,303,972, Cl. 363-10.000.
Vile, Robert L.; and Pitkjaan, Elam, 4,303,965, Cl. 362-61.000.

Weston, David, to Reynolds Metals Company. Upgrading of bauxites, bauxitic clays, and aluminum mineral bearing clays. 4,303,204, Cl. 241-16.000.

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Meredith, Michael D.; Bentvelzen, Jozef M.; and Bepple, Henry, 4,303,470, Cl. 162-57.000.

Wheeler, Dean F., to Colt Industries Operating Corp. Automotive exhaust emission system. 4,302,936, Cl. 60-290.000.

Wheeler, Louis B., to Combustion Engineering, Inc. Filter bag apparatus having an improved fabric filter bag tensioning apparatus. 4,303,424, Cl. 55-365.000.

Whisenhunt, Fred S.; and Street, Lloyd J., to Mueller Co. Valve facing for sliding valve elements or the like. 4,303,223, Cl. 251-357.000.

White, Albert H.; and Zagranski, Raymond D., to Cnandler Evans Inc. Fuel flow limiting device for overspeed and overtemperature control. 4,302,931, Cl. 60-39.28R.

White-BSA Tools Ltd.: *See*—
Dolman, Roy S., 4,302,993, Cl. 82-29.00R.

Whitehurst, Darrell D.; and Yan, Tsoung Y., to Mobil Oil Corporation. Continuous reaction/separation method for nucleated growth reactions. 4,303,494, Cl. 208-8.0LE.

Whitehurst, Darrell D.: *See*—
Mitchell, Thomas O.; Whitehurst, Darrell D.; and Farcasiu, Malvina, 4,303,497, Cl. 208-10.000.

Whitfield, Richard G.; and Cooke, Theodore M., to Exxon Research & Engineering Co. Ink jet printing formulations. 4,303,445, Cl. 106-22.000.

Widmaier, Theo. Feeder table. 4,303,152, Cl. 198-485.000.

Wiedel, John: *See*—
Brouse, S. Bernard; and Wiedel, John, 4,302,991, Cl. 81-429.000.

Wiegers, Robert M. Combination trash receptacle and chopping board. 4,303,285, Cl. 312-211.000.

Wienert, Gisela: *See*—
Laepple, Werner; and Wienert, Gisela, 4,303,537, Cl. 252-30.000.

Wienhoefer, Ekkehard: *See*—
Kosswig, Kurt; and Wienhoefer, Ekkehard, 4,303,544, Cl. 252-174.210.

Wildmoser, Alfred: *See*—
Reimann, Hans; and Wildmoser, Alfred, 4,303,527, Cl. 210-614.000.

Wiley, Thomas W.; and Joyce, William R., to Tex-Fab, Inc. System and method for aligning fabric. 4,303,189, Cl. 226-15.000.

Wilhelm, Donald F., to Helm Instrument Company, Inc. Apparatus and method for determining wire blank length. 4,302,996, Cl. 83-212.000.

Wilhelm, John J.: *See*—
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Wilkens, Christian, to Karl Mayer Textilmaschinenfabrik GmbH. Right-right warp knitting machines. 4,302,953, Cl. 66-87.000.

Williams, David B. Deburring tool. 4,303,356, Cl. 408-187.000.

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Akers, Larry D.; Scholl, Charles H.; Smith, Joseph S.; and Williams, Edward A., 4,303,108, Cl. 141-2.000.

Williams, Henry L., to Geolograph Company, The. Inclinometer test assembly. 4,302,962, Cl. 73-1.00E.

Williams, Robert D.: *See*—
Young, Vernon V.; Williams, Robert D.; and Ivy, Richard E., 4,303,657, Cl. 424-250.000.

Williamson, Robert A., Jr.; and Ford, Roger W., to Foxboro Company, The. Industrial process control system. 4,303,973, Cl. 364-103.000.

Wilson, Robert E., to RCA Corporation. Low power switch closure sensing circuit. 4,303,907, Cl. 340-365.00S.

Wing, Willis G.: *See*—
Levine, Seymour; and Wing, Willis G., 4,302,885, Cl. 33-228.000.

Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., to Firmenich SA; and General Foods Corporation. Flavoring with pyrazine derivatives. 4,303,689, Cl. 426-537.000.

Wirges, Winfried: *See*—
Reuschenbach, Hermann; Wirges, Winfried; and Langanke, Rolf, 4,303,231, Cl. 267-64.150.

Wirt, Leslie S., to Lockheed Corporation. Apparatus for the retroreflection of sound. 4,303,144, Cl. 181-288.000.

Wirt, Leslie S., to Lockheed Corporation. Surface extraction apparatus. 4,303,520, Cl. 210-242.100.

Wirz, Arno: *See*—
Becker, Willi; and Wirz, Arno, 4,303,014, Cl. 101-409.000.

Wittmann, Alois; and Rubin, Charles P., to Hughes Aircraft Company. Apparatus for gyroscopic ejection of shuttle launched spacecraft. 4,303,214, Cl. 244-158.00R.

Witzel, Frank; Di Nolfo, Mario A.; Rodney, Burton; and Mackay, Donald A. M., to Life Savers, Inc. Breath freshener composition and method. 4,303,648, Cl. 424-158.000.

Wolber, Robert; Maurer, Roland; and Jesse, Peter, to Gebruder Junghans GmbH. Electrical contact arrangement for a battery-operated instrument. 4,303,962, Cl. 361-399.000.

Wolf, Alfons: *See*—
Piesch, Steffen; and Wolf, Alfons, 4,303,561, Cl. 260-15.000.

Wolfe, Noah T. System and method of timing golfers on a golf course. 4,303,243, Cl. 273-176.00R.

Wolfgang, Rose, to VEB Kombinat Textima. Jacquard mechanism for knitting machines. 4,302,952, Cl. 66-75.200.

Wolfinger, John F., to General Electric Company. Method and apparatus for monitoring torsional vibration in the rotor of a dynamoelectric machine. 4,303,882, Cl. 324-158.0MG.

Wolter, Heinz, to Dom-Sicherheitstechnik GmbH & Co. KG. Lock cylinder. 4,302,957, Cl. 70-337.000.

Wolter, Heinz. Light connectable with a key. 4,303,966, Cl. 362-116.000.

Wood, John H.; and Twaddell, Victor A., to General Dynamics, Pomona Division. Electroplating of thick film circuitry. 4,303,480, Cl. 204-15.000.

Wood, Peter C.: *See*—
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Woodroof, E. Aubrey. Fabric silicone elastomer composite. 4,303,712, Cl. 428-58.000.

Woodruff, Thomas J.: *See*—
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Wormser, Alex F.: *See—*
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Wormser Engineering, Inc.: *See—*
Perkins, Stephen P.; and Wormser, Alex F., 4,303,023, Cl. 110-347.000.
Wrex-All Implements, Inc.: *See—*
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Xerox Corporation: *See—*
Gruber, Robert J.; and Bolte, Steven B., 4,303,749, Cl. 430-39.000.
Haupt, George J.; Carlson, Gerald E.; and Evanitsky, Eugene S., 4,303,334, Cl. 355-133.000.
Stoffel, James C., 4,303,947, Cl. 358-260.000.
Thompson, Robert L., 4,303,331, Cl. 355-3.0DD.
Yagura, Kazuo: *See—*
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Yakovlev, Vladimir K.; Lugovoi, Elektron P.; and Ivankov, Vasily A. Method of forming helical springs. 4,302,959, Cl. 72-138.000.
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Ohnishi, Shunichi; Obara, Masaharu; Sakurai, Masaru; and Yamada, Hisashi, 4,303,895, Cl. 333-18.000.
Yamada, Toyotaka: *See—*
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Yamaguchi, Nobuo: *See—*
Kishino, Takao; Ichihara, Fumio; and Yamaguchi, Nobuo, 4,303,917, Cl. 340-772.000.
Yamaha Hatsudoki Kabushiki Kaisha: *See—*
Sanmi, Yasumaru; Harada, Norimichi; and Nishida, Yasuhiro, 4,303,401, Cl. 440-88.000.
Yamamitsu, Chojuro; Arimura, Ichiro; and Taniguchi, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Recording and reproducing system. 4,303,952, Cl. 360-65.000.
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Taniguchi, Hiroshi; Yano, Osahiko; Yamamitsu, Chojuro; Kitamura, Sadafumi; and Ohtsu, Masamitsu, 4,303,950, Cl. 360-19.000.
Yamamoto, Hisao: *See—*
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Yamamoto, Yoshimi: *See—*
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Ikeura, Kenji; Saito, Masaaki; Yamane, Michiyoshi; Sanbuichi, Hiroshi; and Isobe, Akio, 4,303,049, Cl. 123-440.000.
Yamashita, Toshiharu, to Hoya Corporation. Near infrared absorption filter for color television cameras. 4,303,298, Cl. 350-1.100.
Yamato Setsubi Koji Kabushiki Kaisha: *See—*
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Yamazaki, Yoshio: *See—*
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Yan, Tsoung Y.: *See—*
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Yang, Kou-Jay: *See—*
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Yankovsky, Oleg A.: *See—*
Maslakov, Petr A.; Klushin, Nikolai A.; Juriev, Leonid A.; Kokarev, Vladimir I.; Kilin, Viktor E.; Galimov, Anas G.; Sutyagin, Oleg Y.; and Yankovsky, Oleg A., 4,303,002, Cl. 91-225.000.
Yano, Kazuhiko; and Ohtsuki, Kazuhiko, to Kanzaki Kokyukoki Mfg. Co., Ltd. Marine propulsion device. 4,303,400, Cl. 440-75.000.
Yano, Osahiko: *See—*
Taniguchi, Hiroshi; Yano, Osahiko; Yamamitsu, Chojuro; Kitamura, Sadafumi; and Ohtsu, Masamitsu, 4,303,950, Cl. 360-19.000.
Yard, John S., to Fischer & Porter Company. Electromagnetic flowmeter system having automatically adjusted response characteristics. 4,303,980, Cl. 364-510.000.
Yasuda, Eturo; and Ohta, Minoru, to Nippon Soken, Inc. Gas sensing apparatus. 4,303,613, Cl. 422-95.000.
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Yatsuzuka, Yohtaro, to Kokusai Denshin Denwa Co., Ltd. Digital speech interpolation system. 4,303,803, Cl. 177-15.55R.
Yazu, Shuji: *See—*
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Yezbick, Patrick A.: *See—*
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Yokono, Hitoshi: *See—*
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Sudo, Ryoichi; Okunaka, Masaaki; Yokono, Hitoshi; Isogai, Tokio; and Yamazaki, Mitsuo, 4,303,554, Cl. 252-518.000.
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Yoseloff, Mark L., to Coleco Industries, Inc. Electronic quiz game utilizing cartridges and method employing same. 4,303,398, Cl. 434-335.000.
Yoshida, Kazunori; Suzuki, Fuzio; Arakawa, Hiroshi; and Kobayashi, Takeshi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho; and Kabushiki Kaisha Toyota Chou Kenkyusho. Method and apparatus for carrying out the filling operation in a jet loom. 4,303,106, Cl. 139-435.000.
Yoshida Kogyo K.K.: *See—*
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Yoshizaki, Shiichiro: *See—*
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Young, Ainslie T., Jr., to Mead Corporation, The. Jet drop printing process utilizing a radiation curable ink. 4,303,924, Cl. 346-1.100.
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Burke, John P.; and Young, Alastair J., 4,303,006, Cl. 92-85.00R.
Young, Chi C.: *See—*
DeMaria, Francesco; and Young, Chi C., 4,303,607, Cl. 264-178.00F.
Young, James E.: *See—*
Kengle, Fritz; and Young, James E., 4,303,194, Cl. 236-15.00E.
Young, Vernon V.; Williams, Robert D.; and Ivy, Richard E., to International Minerals & Chemical Corp. Nitrohydroxyalkyl-substituted quinoxaxiline dioxides and alkanoic acid esters thereof. 4,303,657, Cl. 424-250.000.
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Zerby, Lawrence G., to Powell Industries, Inc. Digital fluid flow control apparatus. 4,303,097, Cl. 137-599.000.

Ziegler, Robert C.: *See*—
Huggins, Dale K.; Queneau, Paul B.; Ziegler, Robert C.; Beckstead, Leo W.; and Hogsett, Robert F., 4,303,623, Cl. 423-55.000.

Zisterer, Peter. Lock against theft for skis. 4,302,954, Cl. 70-18.000.

Zwiener, Rudolf: *See*—
Lucian, Anton; Zwiener, Rudolf; and Roehrich, Siegfried, 4,303,107, Cl. 139-450.000.

# LIST OF REISSUE PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 1ST DAY OF DECEMBER, 1981

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

American Hoechst Corporation: *See*—
Effland, Richard C., Re. 30,809, Cl. 260-326.13F.

Carstab Corporation: *See*—
Kugele, Thomas G.; and Koeniger, Arthur F., Re. 30,810, Cl. 260-429.700.

Dykstra, Stanley J.; and Minielli, Joseph L., to Mead Johnson & Company. Substituted piperidines therapeutic process and compositions. Re. 30,811, Cl. 424-266.000.

Dykstra, Stanley J.; and Minielli, Joseph L., to Mead Johnson & Company. Substituted piperidines therapeutic process and compositions. Re. 30,812, Cl. 546-193.000.

Effland, Richard C., to American Hoechst Corporation. Method of preparation of 3-(3-carboxy-4-hydroxyphenyl)-4,5-dihydro-2-phenylbenz [e]indole and valuable intermediates related thereto. Re. 30,809, Cl. 260-326.13F.

Elders, Gerald W. Point-attack bit. Re. 30,807, Cl. 299-86.000.

Forsslund, Erik E. Intermittence-responsive working-time indicator. Re. 30,813, Cl. 235-92.00T.

Freudenschuss, Otto; Kantner, Otto; and von Belvard, Peter R., to Vockenhuber, Karl; and Hauser, Raimund. Film-transport control for sound-film camera. Re. 30,808, Cl. 352-27.000.

Hauser, Raimund: *See*—
Freudenschuss, Otto; Kantner, Otto; and von Belvard, Peter R., Re. 30,808, Cl. 352-27.000.

Kantner, Otto: *See*—
Freudenschuss, Otto; Kantner, Otto; and von Belvard, Peter R., Re. 30,808, Cl. 352-27.000.

Koeniger, Arthur F.: *See*—
Kugele, Thomas G.; and Koeniger, Arthur F., Re. 30,810, Cl. 260-429.700.

Kugele, Thomas G.; and Koeniger, Arthur F., to Thiokol Corporation; and Carstab Corporation. Carbofunctional sulfur and carboxylate bridged tin compounds. Re. 30,810, Cl. 260-429.700.

Mead Johnson & Company: *See*—
Dykstra, Stanley J.; and Minielli, Joseph L., Re. 30,811, Cl. 424-266.000.
Dykstra, Stanley J.; and Minielli, Joseph L., Re. 30,812, Cl. 546-193.000.

Minielli, Joseph L.: *See*—
Dykstra, Stanley J.; and Minielli, Joseph L., Re. 30,811, Cl. 424-266.000.
Dykstra, Stanley J.; and Minielli, Joseph L., Re. 30,812, Cl. 546-193.000.

Thiokol Corporation: *See*—
Kugele, Thomas G.; and Koeniger, Arthur F., Re. 30,810, Cl. 260-429.700.

Vockenhuber, Karl: *See*—
Freudenschuss, Otto; Kantner, Otto; and von Belvard, Peter R., Re. 30,808, Cl. 352-27.000.

von Belvard, Peter R.: *See*—
Freudenschuss, Otto; Kantner, Otto; and von Belvard, Peter R., Re. 30,808, Cl. 352-27.000.

# LIST OF DESIGN PATENTEES

Adamo, Carole L., to No Spill Inc. Combined cover and sipping tube holder for a tumbler. 262,083, 12-1-81, Cl. D7-40.000.

Airwick Industries, Inc.: *See*—
Bousgarbies, Jacques; and Joyaux, Yves, 262,138, Cl. D23-150.000.
Hoyt, Earl, 262,137, Cl. D23-150.000.

Aktiebologet Bahco Verktyg: *See*—
Wahlberg, Ulf H., 262,090, Cl. D8-58.000.

Allibert Exploitation: *See*—
Deconinck, Didier, 262,077, Cl. D6-70.000.

American Cyanamid Company: *See*—
Tiboldo, Charles J., 262,094, Cl. D9-302.000.

Anzevino, Antonio J. Telegraph key. 262,112, 12-1-81, Cl. D14-93.000.

Aquaria, Inc.: *See*—
Fuerst, Charles O., 262,153, Cl. D30-4.000.

Azuma, Sadayoshi: *See*—
Nakajima, Iwao; Azuma, Sadayoshi; Hoshino, Kunio; and Mishiro, Benito, 262,111, Cl. D14-70.000.

Bankoku Needle Mfg. Co., Ltd.: *See*—
Takahashi, Masamitsu, 262,095, Cl. D9-303.000.

Bates Industries, Inc.: *See*—
Beaubien, Thomas S.; Oehring, Robert E.; and Rich, Dennis C., 262,103, Cl. D12-158.000.

Baus, Andre E. J., to Goodyear Tire & Rubber Company, The. Tire. 262,101, 12-1-81, Cl. D12-143.000.

Baus, Andre E. J.; Fontaine, Jean F. L.; and Ham, Brian L., to Goodyear Tire & Rubber Company, The. Tire. 262,102, 12-1-81, Cl. D12-147.000.

Beaubien, Thomas S.; Oehring, Robert E.; and Rich, Dennis C., to Bates Industries, Inc. Motorcycle saddle bag. 262,103, 12-1-81, Cl. D12-158.000.

Bousgarbies, Jacques; and Joyaux, Yves, to Airwick Industries, Inc. Dispenser for air freshening material. 262,138, 12-1-81, Cl. D23-150.000.

Brady, Hugh F. Holder for crayons and pencils. 262,121, 12-1-81, Cl. D19-82.000.

Brink's Incorporated: *See*—
Harding, Russell H., 262,099, Cl. D12-12.000.

Bush, Lyman F.; and Weaver, Dennis R. Plastic safety cap for placement over the projecting sharp ends of concrete reinforcing bars. 262,093, 12-1-81, Cl. D8-386.000.

Cannella, Armond F., to Cannella Corporation. Hand held calculator. 262,119, 12-1-81, Cl. D18-7.000.

Cannella Corporation: *See*—
Cannella, Armond F., 262,119, Cl. D18-7.000.

Carroll, Robert W.; and Kaplan, Robert A., to Kapcar Productions, Inc. Game board. 262,125, 12-1-81, Cl. D21-25.000.

Chen, Yi. Game board. 262,123, 12-1-81, Cl. D21-20.000.

Compret N.V.: *See*—
Kolbel, Gert F.; and Geisselbrecht, Werner, 262,129, Cl. D21-191.000.

Confon Ag: *See*—
Halm, Hans, 262,120, Cl. D19-76.000.

Cooke, Donald R., to Padco, Inc. Combined paint applicator and roller therefor. 262,075, 12-1-81, Cl. D4-38.100.

CPG Products Corp.: *See*—
Pelavin, Joseph Y., 262,092, Cl. D8-321.000.

Deconinck, Didier, to Allibert Exploitation. Arm chair or similar article. 262,077, 12-1-81, Cl. D6-70.000.

Duckat, Stacey, to National Blood Pressure Services, Inc. Blood pressure medical measurement apparatus. 262,139, 12-1-81, Cl. D24-1.100.

Dulude, Charles R. Gun target. 262,131, 12-1-81, Cl. D22-15.000.

Dunn, Ronald L. Display case for wedding cake decoration. 262,080, 12-1-81, Cl. D6-174.000.

Durrum, Emmett L., to Eldex Laboratories, Inc. High pressure pump. 262,113, 12-1-81, Cl. D15-7.000.

Dynabrade, Inc.: *See*—
Fleckenstein, Elwin H., 262,116, Cl. D15-126.000.

Eldex Laboratories, Inc.: *See*—
Durrum, Emmett L., 262,113, Cl. D15-7.000.

Everlast World's Boxing Headquarters Corp.: *See*—
Toms, John L., 262,070, Cl. D2-232.000.

Fahy, Noel A. Chopstick holder. 262,089, 12-1-81, Cl. D7-152.000.

Fain, Jonathan D., to Teknor Apex Company. Collar for hose couplings and the like. 262,133, 12-1-81, Cl. D23-44.000.

Fleckenstein, Elwin H., to Dynabrade, Inc. Contact arm unit for a belt grinding machine. 262,116, 12-1-81, Cl. D15-126.000.

Fontaine, Jean F. L.: *See*—
Baus, Andre E. J.; Fontaine, Jean F. L.; and Ham, Brian L., 262,102, Cl. D12-147.000.

Frassanito, John R., to Universal Data Systems, Inc. Data modem. 262,106, 12-1-81, Cl. D14-107.000.

Fuerst, Charles O., to Aquaria, Inc. Bird cage. 262,153, 12-1-81, Cl. D30-4.000.

Geisselbrecht, Werner: *See*—
Kolbel, Gert F.; and Geisselbrecht, Werner, 262,129, Cl. D21-191.000.

Goodyear Tire & Rubber Company, The: *See—*
Baus, Andre E. J., 262,101, Cl. D12-143.000.
Baus, Andre E. J.; Fontaine, Jean F. L.; and Ham, Brian L., 262,102, Cl. D12-147.000.
Halls, David K. Fireplace insert structure. 262,135, 12-1-81, Cl. D23-94.000.
Halm, Hans, to Confon Ag. Memorandum register. 262,120, 12-1-81, Cl. D19-76.000.
Ham, Brian L.: *See—*
Baus, Andre E. J.; Fontaine, Jean F. L.; and Ham, Brian L., 262,102, Cl. D12-147.000.
Hanshin Sogyo Co., Ltd.: *See—*
Yoshimoto, Koichi, 262,130, Cl. D21-226.000.
Harada, Toshio: *See—*
Yamamura, Masamichi; Takahashi, Yoichi; Harada, Toshio; and Inoue, Shigefumi, 262,088, Cl. D7-128.000.
Harding, Russell H., to Brink's Incorporated. Armored truck. 262,099, 12-1-81, Cl. D12-12.000.
Hayden, M. Dean, Jr. Jacket-type coaster. 262,084, 12-1-81, Cl. D7-45.000.
Hisano, Yoichi: *See—*
Takenaka, Kazumasa; Kido, Katsutoshi; and Hisano, Yoichi, 262,110, Cl. D14-70.000.
Holloway, Thomas F., to Risdon Corporation. Lipstick case or similar article. 262,152, 12-1-81, Cl. D28-85.000.
Hoshino, Kunio: *See—*
Nakajima, Iwao; Azuma, Sadayoshi; Hoshino, Kunio; and Mishiro, Benito, 262,111, Cl. D14-70.000.
Hoyt, Earl, to Airwick Industries, Inc. Housing for dispensing air treating material. 262,137, 12-1-81, Cl. D23-150.000.
Inoue, Shigefumi: *See—*
Yamamura, Masamichi; Takahashi, Yoichi; Harada, Toshio; and Inoue, Shigefumi, 262,088, Cl. D7-128.000.
Isbell, Clifford S. Desk. 262,081, 12-1-81, Cl. D6-177.000.
Ito, Kenichi: *See—*
Sekita, Isao; Ito, Kenichi; Suzuki, Kiyoshi; Sugisaki, Kazuyoshi; Yamamoto, Masaki; and Mano, Kazunori, 262,109, Cl. D14-70.000.
John McIlwraith Industries Ltd.: *See—*
Jury, William L., 262,154, Cl. D92-26.000.
Jones, Lucien C. Lamp shade. 262,141, 12-1-81, Cl. D26-131.000.
Joyaux, Yves: *See—*
Bousgarbies, Jacques; and Joyaux, Yves, 262,138, Cl. D23-150.000.
Jury, William L., to John McIlwraith Industries Ltd. Expanded panel of extruded metal. 262,154, 12-1-81, Cl. D92-26.000.
Kapcar Productions, Inc.: *See—*
Carroll, Robert W.; and Kaplan, Robert A., 262,125, Cl. D21-25.000.
Kaplan, Robert A.: *See—*
Carroll, Robert W.; and Kaplan, Robert A., 262,125, Cl. D21-25.000.
Kido, Katsutoshi: *See—*
Takenaka, Kazumasa; Kido, Katsutoshi; and Hisano, Yoichi, 262,110, Cl. D14-70.000.
Kimbrough, Richard W. M., to Quaker Oats Company, The. Toy elephant. 262,128, 12-1-81, Cl. D21-162.000.
Kolbel, Gert F.; and Geisselbrecht, Werner, to Compret N.V. Physical exerciser. 262,129, 12-1-81, Cl. D21-191.000.
Kurozumi, Shigeru: *See—*
Yamagami, Masafumi; and Kurozumi, Shigeru, 262,140, Cl. D18-7.000.
LaFrance Corporation: *See—*
Peroni, Peter A., 262,105, Cl. D14-114.000.
Lovejoy, Robert B., to Mattel, Inc. Soccer game display and control panel or similar article. 262,122, 12-1-81, Cl. D21-13.000.
Mano, Kazunori: *See—*
Sekita, Isao; Ito, Kenichi; Suzuki, Kiyoshi; Sugisaki, Kazuyoshi; Yamamoto, Masaki; and Mano, Kazunori, 262,109, Cl. D14-70.000.
Matsushita Electric Industrial Co., Ltd.: *See—*
Nakajima, Iwao; Azuma, Sadayoshi; Hoshino, Kunio; and Mishiro, Benito, 262,111, Cl. D14-70.000.
Sekita, Isao; Ito, Kenichi; Suzuki, Kiyoshi; Sugisaki, Kazuyoshi; Yamamoto, Masaki; and Mano, Kazunori, 262,109, Cl. D14-70.000.
Takenaka, Kazumasa; Kido, Katsutoshi; and Hisano, Yoichi, 262,110, Cl. D14-70.000.
Yamamura, Masamichi; Takahashi, Yoichi; Harada, Toshio; and Inoue, Shigefumi, 262,088, Cl. D7-128.000.
Mattel, Inc.: *See—*
Lovejoy, Robert B., 262,122, Cl. D21-13.000.
McHugh, John O. Fishing lure storage device. 262,132, 12-1-81, Cl. D22-99.000.
Miller, James E. Concrete outdoor cooking grill. 262,086, 12-1-81, Cl. D7-107.000.
Miller, John F. Articulating carrier head. 262,100, 12-1-81, Cl. D34-35.000.
Mishiro, Benito: *See—*
Nakajima, Iwao; Azuma, Sadayoshi; Hoshino, Kunio; and Mishiro, Benito, 262,111, Cl. D14-70.000.
Mittermaier, Armin E.: *See—*
Rowan, David C.; and Mittermaier, Armin E., 262,115, Cl. D15-9.200.
Miyake, Takao: *See—*
Suganoya, Yoshio; and Miyake, Takao, 262,087, Cl. D7-128.000.
Muckenthaler, George J.: *See—*
Weixelman, Louis H., 262,097, Cl. D11-118.000.
Nakajima, Iwao; Azuma, Sadayoshi; Hoshino, Kunio; and Mishiro, Benito, to Matsushita Electric Industrial Co., Ltd. Portable radio. 262,111, 12-1-81, Cl. D14-70.000.
National Blood Pressure Services, Inc.: *See—*
Duckat, Stacey, 262,139, Cl. D24-1.100.
Newton, Jeffrey L. Portable carrying rack for pressurized air containers. 262,078, 12-1-81, Cl. D6-85.000.
No Spill Inc.: *See—*
Adamo, Carole L., 262,083, Cl. D7-40.000.
Odle, Karen D. Wall plaque. 262,098, 12-1-81, Cl. D11-133.000.
Oehring, Robert E.: *See—*
Beaubien, Thomas S.; Oehring, Robert E.; and Rich, Dennis C., 262,103, Cl. D12-158.000.
Padco, Inc.: *See—*
Cooke, Donald R., 262,075, Cl. D4-38.100.
Patrigot, Leon. Air freshener. 262,136, 12-1-81, Cl. D23-150.000.
Pelavin, Joseph Y., to CPG Products Corp. Handle loop for luggage or the like. 262,092, 12-1-81, Cl. D8-321.000.
Perkins, James. Combined lavatory and bathroom cabinet. 262,134, 12-1-81, Cl. D23-59.000.
Peroni, Peter A., to LaFrance Corporation. Side panel for readily disassembled instrument housing. 262,105, 12-1-81, Cl. D14-114.000.
Petley, Derek J. Decanting cradle for a wine bottle or the like. 262,085, 12-1-81, Cl. D7-70.000.
Pfeiffer Gesellschaft mbH: *See—*
Pfeiffer, Micheal, 262,072, Cl. D3-36.000.
Pfeiffer, Micheal, to Pfeiffer Gesellschaft mbH. Tennis bag. 262,072, 12-1-81, Cl. D3-36.000.
Phillippe, Maurice P., to Tyrrell Racing Organisation Limited. Model racing car. 262,127, 12-1-81, Cl. D21-137.000.
Pitney Bowes Inc.: *See—*
Sinn, Hans J.; and Weil, Denis C., 262,118, Cl. D16-31.000.
Plaut, Julie M. Container for fingernail polish and remover. 262,149, 12-1-81, Cl. D28-77.000.
Pracon, David J. Combined record or tape rack and stereo component support stand. 262,076, 12-1-81, Cl. D6-29.000.
Pressure Equipment Limited: *See—*
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Quaker Oats Company, The: *See—*
Kimbrough, Richard W. M., 262,128, Cl. D21-162.000.
Raintree Buckle & Jewelry, Inc.: *See—*
Van Brouwer, Ryk, 262,071, Cl. D2-440.000.
Rankin, Thomas R. Drill display holder. 262,079, 12-1-81, Cl. D6-127.000.
Reavis, Gary E. Portable pipe rack. 262,146, 12-1-81, Cl. D27-06.000.
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Beaubien, Thomas S.; Oehring, Robert E.; and Rich, Dennis C., 262,103, Cl. D12-158.000.
Riggsbee, Sherman L. Tennis scoreboard or the like. 262,096, 12-1-81, Cl. D10-46.100.
Risdon Corporation: *See—*
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Rowan, David C.; and Mittermaier, Armin E., to Tokheim Corporation. Triple gasoline pump. 262,115, 12-1-81, Cl. D15-9.200.
Rowlands, John, to Pressure Equipment Limited. Portable pump. 262,114, 12-1-81, Cl. D15-7.000.
Sandy, Hal D. Display rack module. 262,082, 12-1-81, Cl. D6-189.000.
Sasaki, Kiyohiko, to Yashica Co., Ltd. Surveillance camera. 262,117, 12-1-81, Cl. D16-2.000.
Schnabel, Jack S., to Security Rental Systems, Inc. Case for portable electronics. 262,074, 12-1-81, Cl. D3-76.000.
Security Rental Systems, Inc.: *See—*
Schnabel, Jack S., 262,074, Cl. D3-76.000.
Sekita, Isao; Ito, Kenichi; Suzuki, Kiyoshi; Sugisaki, Kazuyoshi; Yamamoto, Masaki; and Mano, Kazunori, to Matsushita Electric Industrial Co., Ltd. Combined portable television receiver and radio. 262,109, 12-1-81, Cl. D14-70.000.
Sharp Corporation: *See—*
Suganoya, Yoshio; and Miyake, Takao, 262,087, Cl. D7-128.000.
Yamagami, Masafumi; and Kurozumi, Shigeru, 262,140, Cl. D18-7.000.
Sher, S. Franklin. Pipe. 262,142, 12-1-81, Cl. D27-03.000.
Sher, S. Franklin. Pipe. 262,143, 12-1-81, Cl. D27-3.000.
Sher, S. Franklin. Pipe. 262,144, 12-1-81, Cl. D27-03.000.
Sher, S. Franklin. Pipe. 262,145, 12-1-81, Cl. D27-03.000.
Sholl, Harrison W. Game cabinet. 262,124, 12-1-81, Cl. D21-24.000.
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Sussman, Morris, 262,148, Cl. D28-59.000.
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Sussman, Morris, 262,151, Cl. D28-83.000.
Simpson, Ross M. Overflow tray for a car battery. 262,104, 12-1-81, Cl. D13-10.000.
Sinn, Hans J.; and Weil, Denis C., to Pitney Bowes Inc. Document copier. 262,118, 12-1-81, Cl. D16-31.000.
Steck, George L.: *See—*
Steck, Mark A.; and Steck, George L., 262,091, Cl. D8-72.000.
Steck Manufacturing Co., Inc.: *See—*
Steck, Mark A.; and Steck, George L., 262,091, Cl. D8-72.000.

Steck, Mark A.; and Steck, George L., to Steck Manufacturing Co., Inc. Spring compressor. 262,091, 12-1-81, Cl. D8-72.000.
Suganoya, Yoshio; and Miyake, Takao, to Sharp Corporation. Microwave oven. 262,087, 12-1-81, Cl. D7-128.000.
Sugisaki, Kazuyoshi: *See*—
Sekita, Isao; Ito, Kenichi; Suzuki, Kiyoshi; Sugisaki, Kazuyoshi; Yamamoto, Masaki; and Mano, Kazunori, 262,109, Cl. D14-70.000.
Sussman, Morris, to Shore Plastics, Inc. Finger nail buffing wand. 262,147, 12-1-81, Cl. D28-59.000.
Sussman, Morris, to Shore Plastics, Inc. Selective finger nail buffer. 262,148, 12-1-81, Cl. D28-59.000.
Sussman, Morris, to Shore Plastics, Inc. Cosmetic compact. 262,150, 12-1-81, Cl. D28-83.000.
Sussman, Morris, to Shore Plastics, Inc. Compact for cosmetics. 262,151, 12-1-81, Cl. D28-83.000.
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Sekita, Isao; Ito, Kenichi; Suzuki, Kiyoshi; Sugisaki, Kazuyoshi; Yamamoto, Masaki; and Mano, Kazunori, 262,109, Cl. D14-70.000.
Takahashi, Masamitsu, to Bankoku Needle Mfg. Co., Ltd. Packaging container for needles or the like. 262,095, 12-1-81, Cl. D9-303.000.
Takahashi, Yoichi: *See*—
Yamamura, Masamichi; Takahashi, Yoichi; Harada, Toshio; and Inoue, Shigefumi, 262,088, Cl. D7-128.000.
Takenaka, Kazumasa; Kido, Katsutoshi; and Hisano, Yoichi, to Matsushita Electric Industrial Co., Ltd. Portable radio. 262,110, 12-1-81, Cl. D14-70.000.
Teknor Apex Company: *See*—
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Thomas, Wesley L. Telephone. 262,107, 12-1-81, Cl. D14-53.000.
Thomas, Wesley L. Telephone. 262,108, 12-1-81, Cl. D14-53.000.
Tiboldo, Charles J., to American Cyanamid Company. Dispensing container for cream or gel materials or the like. 262,094, 12-1-81, Cl. D9-302.000.
Tokheim Corporation: *See*—
Rowan, David C.; and Mittermaier, Armin E., 262,115, Cl. D15-9.200.
Toms, John L., to Everlast World's Boxing Headquarters Corp. Boxing headguard. 262,070, 12-1-81, Cl. D2-232.000.
Tsukuda, Mitsuo. Baseball game board. 262,126, 12-1-81, Cl. D21-28.000.
Tyrrell Racing Organisation Limited: *See*—
Phillippe, Maurice P., 262,127, Cl. D21-137.000.
Universal Data Systems, Inc.: *See*—
Frassanito, John R., 262,106, Cl. D14-107.000.
Van Brouwer, Ryk, to Raintree Buckle & Jewelry, Inc. Belt buckle. 262,071, 12-1-81, Cl. D2-440.000.
Wahlberg, Ulf H., to Aktiebologet Bahco Verktyg. Cutting nippers. 262,090, 12-1-81, Cl. D8-58.000.
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Bush, Lyman F.; and Weaver, Dennis R., 262,093, Cl. D8-386.000.
Weil, Denis C.: *See*—
Sinn, Hans J.; and Weil, Denis C., 262,118, Cl. D16-31.000.
Weixelman, Louis H., to Muckenthaler, George J., a part interest. Artificial tree or similar article. 262,097, 12-1-81, Cl. D11-118.000.
Yamagami, Masafumi; and Kurozumi, Shigeru, to Sharp Corporation. Electronic calculating machine. 262,140, 12-1-81, Cl. D18-7.000.
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Yamamura, Masamichi; Takahashi, Yoichi; Harada, Toshio; and Inoue, Shigefumi, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 262,088, 12-1-81, Cl. D7-128.000.
Yashica Co., Ltd.: *See*—
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Yoshimoto, Koichi, to Hanshin Sogyo Co., Ltd. Roller skate. 262,130, 12-1-81, Cl. D21-226.000.
Zimmerman, Roy D. Cymbal holder. 262,073, 12-1-81, Cl. D3-73.000.

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# LIST OF DEFENSIVE PUBLICATIONS

## APPLICANTS TO WHOM

## DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 1ST DAY OF DECEMBER, 1981

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Epstein, Joseph W.; Goldman, Leon; and Warren, James D. 3[(3-Alkylamino-2-hydroxypropoxy)phenyl]-1,2-propanediols. T101,305, 12-1-81, Cl. 564-349.000.
Forget, Lawrence E.; Gdula, Robert A.; and Hollis, Joseph C. Selective reactive ion etching of polycrystalline silicon against monocrystalline silicon. T101,302, 12-1-81, Cl. 156-643.000.
Gdula, Robert A.: *See*—
Forget, Lawrence E.; Gdula, Robert A.; and Hollis, Joseph C., T101,302, Cl. 156-643.000.
Goldman, Leon: *See*—
Epstein, Joseph W.; Goldman, Leon; and Warren, James D., T101,305, Cl. 564-349.000.
Hollis, Joseph C.: *See*—
Forget, Lawrence E.; Gdula, Robert A.; and Hollis, Joseph C., T101,302, Cl. 156-643.000.
Holmberg, Roger: *See*—
Persson, Per-Anders; Holmberg, Roger; and Nord, Gunnar, T101,301, Cl. 102-308.000.
Musser, Jay C. Viscosity reducing agents for chocolate coating compositions. T101,304, 12-1-81, Cl. 426-611.000.
Nord, Gunnar: *See*—
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# CLASSIFICATION OF PATENTS

## ISSUED DECEMBER 1, 1981

NOTE.—First number, class; second number, subclass; third number, patent number

**CLASS 2**

2 4,302,847
4,302,848
102 4,302,850
115 4,302,849
158 4,302,851
167 4,302,852
402 4,302,853

**CLASS 3**

1.7 4,302,854
1.9 4,302,855
30 4,302,856

**CLASS 5**

2 R 4,302,857

**CLASS 8**

158 4,303,406
643 4,303,407

**CLASS 9**

310 B 4,302,858
310 E 4,302,859
310 R 4,302,860

**CLASS 12**

142 S 4,302,861

**CLASS 13**

13 4,303,797

**CLASS 15**

117 4,302,862
183 4,302,863

**CLASS 16**

85 4,302,864
97 4,302,865
171 4,302,866

**CLASS 17**

11 4,302,867
32 4,302,868

**CLASS 23**

230 B 4,303,408
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230 EP 4,303,411
230 R 4,303,410

**CLASS 24**

115 R 4,302,869

**CLASS 29**

40 4,302,870
110 4,302,871
159.03 4,302,872
259 4,302,873
426.6 4,302,874
571 4,302,875

**CLASS 30**

47 4,302,876
161 4,302,877
347 4,302,878
382 4,302,879
4,302,880

**CLASS 33**

178 F 4,302,881
180 AT 4,302,883
180 B 4,302,882
180 R 4,302,884
228 4,302,885
312 4,302,886

**CLASS 34**

13.8 4,302,887
48 4,302,888

**CLASS 36**

4 4,302,889
7.6 4,302,890
7.8 4,302,891
31 4,302,892

**CLASS 37**

66 4,302,893
130 4,302,894

**CLASS 38**

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**CLASS 40**

209 4,302,896
605 4,302,897

**CLASS 42**

1 LP 4,302,898

**CLASS 43**

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**CLASS 44**

1 D 4,303,412
10 A 4,303,413
63 4,303,414

**CLASS 46**

29 4,302,900
74 D 4,302,901
132 4,302,902
150 4,302,903

**CLASS 47**

1.5 4,302,904
58 4,302,905
62 4,302,906

**CLASS 48**

202 4,303,415

**CLASS 49**

65 4,302,907
122 4,302,908

**CLASS 51**

157 4,302,909
170 MT 4,302,910
293 4,303,416
334 4,302,911
418 4,302,912

**CLASS 52**

39 4,302,913
80 4,302,914
175 4,302,915
213 4,302,916
221 4,302,917
421 4,302,918

**CLASS 53**

250 4,302,919
399 4,302,920

**CLASS 55**

96 4,303,417
145 4,303,418
185 4,303,419
242 4,303,420
290 4,303,421
319 4,303,422
337 4,303,423
365 4,303,424
378 4,303,425
498 4,303,426

**CLASS 56**

13.6 4,302,921
235 4,302,922
341 4,302,923

**CLASS 57**

58.52 4,302,924
58.95 4,302,925
4,302,926
122 4,302,927
130 4,302,928
247 4,302,929
279 4,302,930

**CLASS 60**

39.28 R 4,302,931
39.32 4,302,932
261 4,302,933
262 4,302,934
272 4,302,935
290 4,302,936
330 4,302,937
527 4,302,938
4,302,939
754 4,302,940
757 4,302,941

**CLASS 62**

9 4,303,427
13 4,303,428
49 4,302,943
59 4,302,944
81 4,302,945
82 4,302,946
155 4,302,947
235.1 4,302,942
256 4,302,948
402 4,302,949
514 R 4,302,950

**CLASS 64**

27 C 4,302,951

**CLASS 65**

1 4,303,429
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21.4 4,303,431
4,303,432
4,303,433
27 4,303,434
29 4,303,435
67 4,303,436
99 A 4,303,437

**CLASS 66**

75.2 4,302,952
87 4,302,953

**CLASS 70**

18 4,302,954
30 4,302,955
312 4,302,956
337 4,302,957

**CLASS 71**

27 4,303,438
88 4,303,439
89 4,303,440

**CLASS 72**

71 4,302,958
138 4,302,959
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451 4,302,961

**CLASS 73**

1 E 4,302,962
1 J 4,302,963
35 4,302,964
55 4,302,965
66 4,302,966
84 4,302,967
160 4,302,968
170 R 4,302,969
339 R 4,302,970
356 4,302,971
362 AR 4,302,972
384 4,302,973
460 4,302,975
639 4,302,976
658 4,302,977
828 4,302,978
4,302,979
861.55 4,302,980
864.62 4,302,974

**CLASS 74**

89.15 4,302,981
4,302,982
104 4,302,983
375 4,302,984
403 4,302,985
574 4,302,986
594.6 4,302,987
798 4,302,988

**CLASS 75**

109 4,303,441
243 4,303,442

**CLASS 81**

5.1 R 4,302,989
60 4,302,990
429 4,302,991

**CLASS 82**

19 4,302,992
29 R 4,302,993

**CLASS 83**

23 4,302,994
104 4,302,995
212 4,302,996
425.3 4,302,997
524 4,302,998

**CLASS 84**

1.01 4,302,999
346 4,303,000

**CLASS 91**

225 4,303,002
453 4,303,003
488 4,303,004

**CLASS 92**

52 4,303,005
85 R 4,303,006

**CLASS 98**

40 D 4,303,007

**CLASS 99**

353 4,303,008
474 4,303,009

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100 4,303,010
122 4,303,011
272 4,303,012

**CLASS 101**

99 4,303,013
409 4,303,014

**CLASS 102**

492 4,303,015

**CLASS 104**

173 ST 4,303,016
294 4,303,017

**CLASS 106**

1.23 4,303,443
16 4,303,444
22 4,303,445
88 4,303,450

**CLASS 108**

12 4,303,018
51.1 4,303,019
51.3 4,303,020

**CLASS 109**

19 4,303,021

**CLASS 110**

245 4,303,022
347 4,303,023

**CLASS 112**

79 R 4,303,024
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121.15 4,303,026
121.26 4,303,027
158 E 4,303,028
231 4,303,029
286 4,303,030
316 4,303,031

**CLASS 113**

116 QA 4,303,032

**CLASS 114**

61 4,303,033
67 A 4,303,034
187 4,303,035
227 4,303,036
230 4,303,037

**CLASS 119**

14.36 4,303,038
52 R 4,303,039
62 4,303,040
96 4,303,041

**CLASS 122**

17 4,303,042
382 4,303,043

**CLASS 123**

65 R 4,303,044
266 4,303,045
308 4,303,046
327 4,303,047
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557 4,303,051
563 4,303,052
568 4,303,053

**CLASS 125**

11 R 4,303,054

**CLASS 126**

93 4,303,055
121 4,303,056
415 4,303,057
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438 4,303,059
445 4,303,060
450 4,303,061

**CLASS 127**

32 4,303,451
4,303,452

**CLASS 128**

1.3 4,303,062
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62 A 4,303,064
80 A 4,303,065
156 4,303,066
214 B 4,303,068
218 N 4,303,069
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**CLASS 130**

27 J 4,303,078
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**CLASS 131**

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7 4,303,085
73.6 4,303,086

**CLASS 134**

10 4,303,453
11 4,303,454
58 R 4,303,087

**CLASS 137**

102 4,303,088
113 4,303,089
114 4,303,090
117 4,303,091
142 4,303,092
315 4,303,093
375 4,303,094
493.8 4,303,095
512 4,303,096
599 4,303,097
614.06 4,303,098
625.21 4,303,099
853 4,303,100

**CLASS 138**

89 4,303,101
96 R 4,303,102
97 4,303,103
121 4,303,104
149 4,303,105

**CLASS 139**

435 4,303,106
450 4,303,107

**CLASS 141**

2 4,303,108
98 4,303,109
362 4,303,110

**CLASS 144**

2 R 4,303,111
193 A 4,303,112
230 4,303,113

**CLASS 148**

1.5 4,303,455

**CLASS 152**

192 4,303,114
209 R 4,303,115
224 4,303,116

**CLASS 156**

78 4,303,456
149 4,303,457
158 4,303,458
227 4,303,459
273 4,303,460
361 4,303,461
538 4,303,462
603 4,303,463
605 4,303,464
616 R 4,303,465
626 4,303,466
643 4,303,467

**CLASS 159**

47 R 4,303,468

**CLASS 160**

189 4,303,117

**CLASS 162**

30 R 4,303,469
57 4,303,470
158 4,303,471
221 4,303,472

**CLASS 164**

415 4,303,118
462 4,303,119
472 4,303,120

**CLASS 165**

1 4,303,121
39 4,303,122
166 4,303,123
167 4,303,124
168 4,303,125

**CLASS 166**

245 4,303,126
266 4,303,127
302 4,303,128

**CLASS 172**

530 4,303,129

**CLASS 173**

23 4,303,130
134 4,303,131
4,303,133
147 4,303,132

**CLASS 174**

68.5 4,303,798
176 4,303,799

**CLASS 175**

61 4,303,134
73 4,303,135
296 4,303,138
329 4,303,136
374 4,303,137

**CLASS 177**

15.55 R 4,303,803
210 FP 4,303,139

**CLASS 179**

1 G 4,303,800
2 A 4,303,802
5 R 4,303,801
18 BC 4,303,804
81 R 4,303,805
115.5 VC 4,303,806
146 E 4,303,807
175.3 F 4,303,808
189 D 4,303,809

**CLASS 180**

6.2 4,303,140

**CLASS 181**

120 4,303,141
144 4,303,142
263 4,303,143
288 4,303,144

**CLASS 182**

122 4,303,145

**CLASS 188**

71.8 4,303,146
298 4,303,147
331 4,303,148

**CLASS 192**

70.19 4,303,149
88 B 4,303,150
114 R 4,303,151

**CLASS 198**

485 4,303,152

**CLASS 200**

5 A 4,303,811
5 R 4,303,810
6 R 4,303,812
52 R 4,303,813
147 R 4,303,814
330 4,303,815

**CLASS 201**

2.5 4,303,477

**CLASS 203**

19 4,303,478
89 4,303,479

**CLASS 204**

15 4,303,480
25 4,303,481
129.3 4,303,482
157.1 R 4,303,483
159.13 4,303,484
159.24 4,303,485
162 R 4,303,486
180 P 4,303,487
181 R 4,303,488
192 C 4,303,490
192 R 4,303,489
279 4,303,491
300 R 4,303,492
301 4,303,493

**CLASS 206**

45.31 4,303,153
86 4,303,154
264 4,303,155
305 4,303,156
335 4,303,157
373 4,303,158
387 4,303,159
455 4,303,160
578 4,303,161

**CLASS 208**

8 LE 4,303,494
4,303,495
4,303,496
10 4,303,497
33 4,303,499
93 4,303,498
139 4,303,500

**CLASS 209**

2 4,303,501
3 4,303,502
3.3 4,303,503
5 4,303,505
223 R 4,303,504
247 4,303,506
252 4,303,507
297 4,303,508
403 4,303,509
457 4,303,510

**CLASS 210**

93 4,303,512
132 4,303,513
136 4,303,514
169 4,303,515
195.4 4,303,516
208 4,303,517
236 4,303,518
238 4,303,519
242.1 4,303,520
282 4,303,521
297 4,303,522
386 4,303,523
406 4,303,524
455 4,303,525
512.3 4,303,526
614 4,303,527
615 4,303,528
635 4,303,529
651 4,303,530
663 4,303,531
724 4,303,511
732 4,303,532
791 4,303,533

**CLASS 211**

49 D 4,303,162
133 4,303,163

**CLASS 212**

146 4,303,164
184 4,303,165
233 4,303,166

**CLASS 215**

256 4,303,167
344 4,303,168

**CLASS 219**

10.49 R 4,303,816
10.55 B 4,303,818
10.55 D 4,303,817
10.55 R 4,303,819
10.81 4,303,820
73 4,303,821
73.1 4,303,822
75 4,303,823
121 FS 4,303,824
201 4,303,825
301 4,303,826
512 4,303,827
521 4,303,828

**CLASS 220**

1.5 4,303,169
70 4,303,170
238 4,303,171
252 4,303,172
254 4,303,173
263 4,303,174
288 4,303,175
306 4,303,176
323 4,303,177
345 4,303,178

**CLASS 221**

7 4,303,179

**CLASS 222**

204 4,303,180
591 4,303,181
600 4,303,182

**CLASS 223**

67 4,303,183

**CLASS 224**

32 R 4,303,184
193 4,303,185
211 4,303,186
222 4,303,187
253 4,303,188

**CLASS 226**

15 4,303,189

**CLASS 229**

5.6 4,303,190
44 CB 4,303,191

**CLASS 233**

7 4,303,192
23 A 4,303,193

**CLASS 235**

92 FP 4,303,850
92 PK 4,303,851
92 T Re.30,813
382 4,303,852
400 4,303,853
492 4,303,854

**CLASS 236**

15 E 4,303,194
48 R 4,303,195
88 4,303,196
92 R 4,303,197

**CLASS 237**

56 4,303,198

**CLASS 238**

2 4,303,199

**CLASS 239**

223 4,303,200
383 4,303,201
664 4,303,202
710 4,303,203

**CLASS 241**

16 4,303,204
17 4,303,205
24 4,303,206
261.2 4,303,207

**CLASS 242**

107 4,303,208
107.4 A 4,303,209
200 4,303,210

**CLASS 244**

3.19 4,303,211
122 AD 4,303,212
137 R 4,303,213
158 R 4,303,214

**CLASS 246**

182 B 4,303,215

**CLASS 248**

74 PB 4,303,216
146 4,303,218
221.1 4,303,217
425 4,303,219
679 4,303,220

**CLASS 249**

102 4,303,221

**CLASS 250**

226 4,303,855
229 4,303,856
328 4,303,857
4,303,858
338 4,303,859
363 S 4,303,860
370 4,303,861
372 4,303,862
385 4,303,863
396 R 4,303,864
423 R 4,303,865
442 4,303,866
445 T 4,303,829
4,303,830
551 4,303,831
556 4,303,832

**CLASS 251**

7 4,303,222
357 4,303,223

**CLASS 252**

3 4,303,534
30 4,303,537
37.7 4,303,538
47 4,303,539
49.3 4,303,540
51.5 A 4,303,535
67 4,303,536
70 4,303,541
91 4,303,542
117 4,303,543
174.21 4,303,544
4,303,545
180 4,303,546
301.4 F 4,303,547
316 4,303,548
321 4,303,549
413 4,303,550
430 4,303,551
465 4,303,552
478 4,303,553
518 4,303,554
522 R 4,303,555
527 4,303,556
4,303,557
548 4,303,558

**CLASS 254**

131 4,303,224
344 4,303,225

**CLASS 256**

25 4,303,226

**CLASS 260**

2.3 4,303,559
4 R 4,303,560
15 4,303,561
17.5 4,303,562
18 PF 4,303,581
23 AR 4,303,563
23 CP 4,303,565
23 XA 4,303,564
29.1 SB 4,303,566
29.2 UA 4,303,567
29.6 MP 4,303,568
29.7 PT 4,303,569
31.2 R 4,303,570
33.6 AQ 4,303,571
37 SB 4,303,572
40 R 4,303,573
42.15 4,303,574
45.75 B 4,303,578
45.75 C 4,303,577
45.8 A 4,303,575
45.9 QB 4,303,576
45.95 E 4,303,579
113 4,303,580
239.1 4,303,582
239.3 T 4,303,583
244.4 4,303,584
326.13 F Re.30,809
343.3 R 4,303,585
348.31 4,303,586
4,303,587
404.5 4,303,588
410.9 R 4,303,589
4,303,590
429.7 Re.30,810
4,303,591
543 F 4,303,592
544 F 4,303,593
546 4,303,594
746 4,303,595
4,303,596
933 4,303,597

**CLASS 261**

39 B 4,303,598
98 4,303,599
112 4,303,600
142 4,303,601

**CLASS 264**

40.1 4,303,608
45.4 4,303,602
69 4,303,603
101 4,303,604
158 4,303,605
176 F 4,303,606
178 F 4,303,607
504 4,303,609

**CLASS 266**

69 4,303,227
96 4,303,228
135 4,303,229
270 4,303,230

**CLASS 267**

64.15 4,303,231
88 4,303,232

**CLASS 269**

54.5 4,303,233

**CLASS 271**

109 4,303,234
162 4,303,235

**CLASS 272**

18 4,303,236
22 4,303,237
66 4,303,238
119 4,303,239

**CLASS 273**

1 GF 4,303,240
26 C 4,303,241
93 R 4,303,242
176 R 4,303,243
183 B 4,303,244
185 R 4,303,245
271 4,303,246
324 4,303,247
356 4,303,248

**CLASS 277**

152 4,303,249
189 4,303,250
236 4,303,251

**CLASS 279**

35 4,303,252

**CLASS 280**

11.27 4,303,253
43.2 4,303,254
234 4,303,255
261 4,303,256
279 4,303,257
403 4,303,258
615 4,303,259
625 4,303,260

**CLASS 285**

31 4,303,261
232 4,303,262
249 4,303,263

**CLASS 290**

1 R 4,303,833
55 4,303,834
4,303,835

**CLASS 292**

7 4,303,264
145 4,303,265
166 4,303,266

**CLASS 293**

155 4,303,267

**CLASS 294**

16 4,303,268
86 R 4,303,269
88 4,303,270

**CLASS 296**

10 4,303,271

**CLASS 297**

153 4,303,272

**CLASS 299**

2 4,303,273
12 4,303,274
31 4,303,275
43 4,303,276
4,303,277
86 Re.30,807

**CLASS 305**

35 R 4,303,278

**CLASS 307**

114 4,303,836
262 4,303,837
272 A 4,303,838
304 4,303,839
427 4,303,840
570 4,303,841

**CLASS 308**

6 C 4,303,279
4,303,280
10 4,303,281
36 4,303,282

**CLASS 310**

64 4,303,842
67 R 4,303,843
154 4,303,844
306 4,303,845

**CLASS 312**

135 4,303,283
189 4,303,284
211 4,303,285
214 4,303,286
215 4,303,287
4,303,288
330 R 4,303,289

**CLASS 313**

178 4,303,846
217 4,303,847
346 R 4,303,848

**CLASS 315**

241 P 4,303,849
360 4,303,867
364 4,303,868

**CLASS 316**

20 4,303,290

**CLASS 318**

130 4,303,869
135 4,303,870
138 4,303,871
257 4,303,872
301 4,303,873
331 4,303,874
667 4,303,875

**CLASS 320**

2 4,303,876
6 4,303,877

**CLASS 322**

99 4,303,878

**CLASS 324**

99 D 4,303,880
142 4,303,881
158 MG 4,303,882
208 4,303,883
220 4,303,884
237 4,303,885
255 4,303,886
329 4,303,879
441 4,303,887

**CLASS 329**

103 4,303,888

**CLASS 330**

107 4,303,889
257 4,303,890
260 4,303,891
286 4,303,892

**CLASS 331**

1 A 4,303,893

**CLASS 332**

16 T 4,303,894

**CLASS 333**

18 4,303,895
28 R 4,303,896
114 4,303,898
189 4,303,897
225 4,303,899
239 4,303,900

**CLASS 335**

272 4,303,901

**CLASS 336**

83 4,303,902

**CLASS 338**

4 4,303,903

**CLASS 339**

17 B 4,303,291
45 M 4,303,292
61 M 4,303,293
74 R 4,303,294
92 R 4,303,295
122 R 4,303,296
218 M 4,303,297

**CLASS 340**

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41 R 4,303,905
52 R 4,303,906
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772 4,303,917
778 4,303,918
825.69 4,303,911
870.37 4,303,919

**CLASS 343**

17.1 R 4,303,920
18 E 4,303,921
114 4,303,922
771 4,303,923

**CLASS 346**

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68 4,303,926
75 4,303,927
4,303,928
140 R 4,303,929

**CLASS 350**

1.1 4,303,298
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96.18 4,303,301
96.20 4,303,300
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354 4,303,309
357 4,303,310
427 4,303,311
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456 4,303,313
4,303,314
461 4,303,315

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27 Re.30,808
57 4,303,316

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24 4,303,318
25 4,303,319
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27 4,303,333
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39 4,303,336
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14 4,303,934
17 4,303,931
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50 4,303,933
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86 4,303,937
139 4,303,938
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147 4,303,941
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167 4,303,943
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222 4,303,945
254 4,303,946
260 4,303,947
287 4,303,948

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19 4,303,950
46 4,303,951
65 4,303,952
78 4,303,953
90 4,303,954
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123 4,303,956

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100 4,303,958
124 4,303,959
212 4,303,960
230 4,303,961
399 4,303,962

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15 4,303,963
16 4,303,964
61 4,303,965
116 4,303,966
119 4,303,967
147 4,303,968
153 4,303,969
203 4,303,970
297 4,303,971

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453 4,303,978
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569 4,303,983
571 4,303,984
701 4,303,985
900 4,303,986
4,303,987
4,303,988
4,303,989
4,303,990
4,303,991

**CLASS 365**

51 4,303,992
230 4,303,993

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35 4,303,994

**CLASS 368**

28 4,303,995
82 4,303,996
259 4,303,997

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29 4,303,998
75 4,303,999

**CLASS 370**

70 4,304,000

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8 4,304,001
49 4,304,002
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175 4,303,474
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55 4,303,622
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591 4,303,632

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324 4,303,673
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343 4,303,675
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332 4,303,685
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580 4,303,692

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479 4,303,768

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170 4,303,775
171 4,303,776
312 4,303,778
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416 4,303,782
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51 4,303,786
103 4,303,787

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| | 4,302,892 | | 4,303,551 | | 4,303,632 | | 4,302,991 | | 4,303,969 | | 4,303,351 |
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| | 4,303,058 | | 4,303,813 | | 4,302,974 | | 4,303,142 | | 4,303,990 | | 4,303,744 |
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